C21.5:956/2

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UNITED STATES PATENT AND TRADEMARK OFFICE

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March 8, 1977

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Office

OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

March 8, 1977 Volume 956 Number 2

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PATENT AND TRADEMARK OFFICE NOTICES

United States Patent and Trademark Office
Before the Commissioner of Patents and Trademarks

IN RE JOHN N. WALTON, RESPONDENT. PROCEEDINGS FOR DISBARMENT

Final Order

Whereas on December 23, 1976, John N. Walton, respondent, was given a period of one month within which to show cause why his name should not be removed from the roster of agents registered to practice before the United States Patent and Trademark Office and whereas respondent has not submitted any reply, it is ordered that the name of John N. Walton of Toronto, Canada, whose registration number is 25760, be and the same is hereby removed from the roster of agents registered to practice before the United States Patent and Trademark Office.

This action is taken under the provisions of 35 U.S.C. § 32 and 37 CFR § 1.348.

Dated: Feb. 1, 1977.

C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,891,375, Vadamme and Rouyer APPARATUS FOR THE PRODUCTION OF HIGH-BULK YARN; **3,012,397,** H. Servage, METHOD OF MAKING HIGH-BULK YARNS; **3,165,881,** De Moncuit and Crouzet, PRODUCTION OF HIGH BULK YARNS; **3,232,037,** H. Crouzet, FALSE-TWIST SPINDLE; **3,584,450,** same, PROCESS AND DEVICE FOR THE MANUFACTURE OF TEXTURED YARNS, **filed** Oct. 15, 1976, D.C., M.D.N.C. (Greensboro), Doc. C–76–550–G, *Deering Milliken Research Corporation and Chavanoz, S.A.* v. *Sapona Manufacturing Company, Incorporated.*

3,012,397. (See 2,891,375.)

3,078,172, L. L. Libby, PREPARED FROZEN FOOD FOR COOKING AND METHOD OF PREPARING THE SAME, **filed** Oct. 20, 1976, D.C., S.D. Fla. (Fort Lauderdale), Doc. 76–1838–C–NCR, *Tra-Way Corp.* v. *Winn-Dixie Stores, Inc.*

3,102,690, G. M. Fee, RAIL ANCHORS; **3,118,327,** W. J. Eastman, TRANSFER MECHANISMS; **3,159,198,** H. E. Sutch, METHOD OF AND APPARATUS FOR THE MANUFACTURE OF RAIL ANCHORS, **filed** Sept. 12, 1973, D.C. Colo. (Denver), Doc. C–5347, *True Temper Corporation* v. *C.F. & I. Steel Corporation.* Judgment, defendant did not infringe upon plaintiff's patent; certain claims invalid, void and unenforceable; plaintiff enjoined from asserting that patents or claims noted were infringed by defendant; complaint dismissed. Claims for relief with respect to Patent '327 dismissed Mar. 21, 1975. Decision entered Oct. 15, 1976.

3,112,536, A. E. Luetzow, METHOD AND APPARATUS FOR FORMING A COVERING ABOUT A GARMENT, **filed** July 1, 1976, D.C., E.D. Wis. (Milwaukee), Doc. 76–469, *Albert E. Luetzow* v. *BMT Manufacturing Corporation and Jockey International, Inc.* Plaintiff's notice of dismissal with prejudice pursuant to Rule 41(a)(1), F.R.C.P., Sept. 27, 1976.

3,118,327. (See 3,102,690.)

3,159,198. (See 3,102,690.)

3,165,881. (See 2,891,375.)

3,232,037. (See 2,891,375.)

3,311,293, R. A. Moffatt, INTEGRAL VACUUM PUMP AND AIR COMPRESSOR, **filed** Feb. 24, 1975, D.C., N.D. Ill. (Chicago), Doc. 75c595, *Gast Manufacturing Company* v. *Intl. Telephone & Telegraph Corp.* Order, this cause is hereby dismissed without prejudice and with leave to reinstate upon motion of either party, Nov. 25, 1975.

3,319,392, J. V. Fitzgerald, FLEXIBLE CERAMIC TILE UNIT, **filed** June 7, 1976, D.C., N.D. Tex. (Dallas), Doc. CA–3–76–0786, *Tile Council of America, Inc.* v. *Dallas Ceramic Co.*

3,338,236, J. J. McLeod, Jr. PADDED CLAVICLE SPLINT, **filed** July 29, 1976, D.C., N.D. Calif. (San Francisco), Doc. C–76–1601 GBH, *John J. McLeod, Jr.* v. *Hosmer-Dorrance, Inc., doing business as Chick Orthopedic.*

3,584,450. (See 2,891,375.)

3,584,805, L. H. Lee, TAPE TRANSPORT APPARATUS, **filed** Oct. 20, 1976, D.C., N.D. Tex. (Wichita Falls), Doc. 7–76–0062, *Recortec, Inc.* v. *Graham Magnetics, Inc. and Control Technology, Inc.*

3,636,611, I. W. Rosenbaum, APPARATUS FOR SPLICING WIRES, **filed** June 20, 1973, D.C., S.D.N.Y., Doc. 73–2743, *General Staple Co. Inc., etc.* v. *George Magnifico.* Judgment, complaint is dismissed on the merits, entered Mar. 17, 1976. **Same, filed** Mar. 7, 1975, D.C., S.D.N.Y., Doc. 75–C–1139, *General Staple Co., Inc.* v. *Amtronics Inc. and Jack Garfinkel.* Complaint is dismissed on the merits, etc., entered Mar. 17, 1976.

3,651,320, M. L. Lasker, LIGHTING FIXTURES, **filed** Nov. 2, 1976, D.C. Pa. (Philadelphia), Doc. 76–3411, *Wylain, Inc.* v. *Penns' Landing Corporation.*

3,713,926, L. Speer, METHOD FOR PATCHING MATERIALS, **filed** Oct. 8, 1976, D.C., N.D. Ohio (Toledo), Doc. 76–129, *Vyna-Chem (Canada) Ltd.* v. *Lawrence L. Speer et al.*

3,829,935, J. G. Critchfield, BUTTON COLLET, **filed** Oct. 22, 1976, D.C., W.D.N.C. (Statesville), Doc. ST–C–76–44, *Handy Button Machine Company* v. *Yarborough & Company.* **Same, filed** Oct. 22, 1976, D.C., W.D.N.C. (Statesville), Doc. ST–C–76–45, *Handy Button Machine Company* v. *Granlin Enterprises Limited.*

3,876,548, D. P. Welles, Jr., SCREENING METHOD AND APPARATUS, **filed** May 11, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c1761, *Hydrocyclonics Corp.* v. *The Carborundum Co.*

3,986,375, O'Mahoney and Paterson, APPARATUS FOR SPACE DYEING YARN AND PRODUCT, **filed** Oct. 21, 1976, D.C., N.D. Ga. (Rome), Doc. C76–145R, *Interdye Technology Corporation* v. *Triad Yarn Dyeing, Inc.*

Re. 26,667, E. G. Sarbo, FOOT COVER AND METHOD OF MANUFACTURING THE SAME, **filed** Oct. 9, 1973, D.C., W.D.N.C. (Statesville), Doc. ST–C–73–24, *Wayne-Gossard Corporation* v. *Moretz Hosiery Mills, Inc.* Final judgment, defendants are hereby restrained and enjoined directly or indirectly from manufacturing, using or selling Styles No. 2444, 2445, 2446, 2447, 2448 and 2480 or any other knitted shoe top length foot covers embodying the invention claimed in Claims 4 and 5 of said reissue patent, Oct. 21, 1976.

D. 235,771, R. L. Christophel, POULTRY WATERING VALVE, **filed** Oct. 21, 1976, D.C.S.C. (Columbia), Doc. 76–1944, *Shenandoah Manufacturing Company, Inc.* v. *Agricultural Manufacturing and Textiles Inc., Hank D. Beesley and Charles D. Little.*

Pl. Pat. 3,561, Bringhurst and Voth, STRAWBERRY PLANT, **filed** Oct. 18, 1976, D.C., E.D.N.C. (Wilmington), Doc. 76–0070–C–7, *State of Calif., L. T. Wallace, Dir. Food & Agriculture, Calif. Strawberry Advisory Bd., and The Regents of the Univ. of Calif.* v. *C. E. Lewis, doing business as Lewis Strawberry Nursery.*

Erratum

Under Patent Suits, in the OFFICIAL GAZETTE of August 10, 1976, volume 949, page 433, the entire paragraph beginning with 3,845,389 should be deleted.

PATENT NOTICES

Certificates of Correction for the Week of Mar. 8, 1977

Re. 28,912	3,961,617	3,989,068	3,994,583
Re. 28,967	3,962,133	3,989,522	3,994,849
Re. 29,015	3,963,584	3,989,588	3,994,947
3,549,429	3,965,043	3,989,728	3,995,277
3,619,191	3,965,667	3,989,773	3,995,708
3,627,296	3,966,842	3,990,411	3,995,740
3,689,991	3,967,541	3,990,490	3,996,163
3,693,126	3,969,376	3,990,579	3,996,205
3,738,187	3,969,378	3,991,604	3,996,323
3,790,606	3,970,627	3,991,631	3,996,354
3,810,465	3,970,646	3,991,816	3,996,463
3,827,194	3,971,444	3,991,822	3,996,668
3,836,496	3,972,228	3,992,204	3,996,684
3,852,579	3,972,403	3,992,333	3,996,928
3,865,977	3,972,832	3,992,435	3,997,049
3,873,446	3,972,935	3,992,455	3,997,182
3,881,151	3,975,565	3,992,466	3,997,267
3,883,074	3,976,512	3,992,472	3,997,297
3,900,688	3,976,620	3,992,549	3,997,368
3,906,100	3,976,924	3,992,556	3,997,431
3,910,935	3,977,983	3,992,560	3,997,475
3,917,827	3,978,104	3,992,674	3,997,477
3,920,364	3,979,592	3,992,694	3,998,524
3,926,734	3,980,293	3,992,725	3,998,602
3,926,777	3,980,317	3,992,772	3,998,660
3,928,229	3,980,343	3,992,933	3,998,693
3,932,395	3,980,622	3,993,146	3,998,806
3,932,597	3,982,565	3,993,235	3,998,899
3,933,620	3,983,068	3,993,258	3,998,913
3,933,665	3,983,399	3,993,289	3,999,314
3,937,907	3,983,419	3,993,333	3,999,338
3,939,955	3,983,610	3,993,370	3,999,349
3,941,121	3,983,788	3,993,371	3,999,459
3,941,311	3,984,223	3,993,400	3,999,772
3,944,644	3,984,352	3,993,401	3,999,851
3,947,290	3,984,498	3,993,583	3,999,911
3,950,031	3,984,745	3,993,845	3,999,936
3,951,303	3,984,753	3,993,888	4,000,001
3,952,075	3,985,034	3,993,913	4,000,263
3,953,439	3,985,711	3,993,927	4,000,274
3,954,616	3,985,932	3,993,947	4,000,296
3,956,102	3,986,121	3,993,963	4,000,357
3,956,326	3,986,252	3,994,146	4,000,478
3,957,875	3,986,426	3,994,297	4,000,504
3,958,998	3,987,693	3,994,346	4,001,571
3,959,143	3,988,674	3,994,362	
3,959,557	3,988,690	3,994,379	
3,960,970	3,988,939	3,994,449	

Disclaimers

3,635,957.—*Guido R. Genta*, Lock Haven, Pa. STYRYL DYES. Patent dated Jan. 18, 1972. Disclaimer filed Jan. 12, 1977, by the assignee, *American Color & Chemical Corporation*.

Hereby enters this disclaimer to claims 1 and 5 of said patent.

3,680,323.—*Ragner Bognaes*, Jeloy and *Olav Solberg*, Oslo, Norway. TANKER FOR LIQUIFIED AND/OR COMPRESSED GAS. Patent dated Aug. 1, 1972. Disclaimer filed Dec. 21, 1976, by the assignee, *Kvaerner Brug AS*.

Hereby enters this disclaimer to the term subsequent to July 18, 1989.

3,828,709.—*Ragner Bognaes*, Jeloy, and *Olav Solberg*, Oslo, Norway. LNG CARGO TANK INSULATION SYSTEM. Patent dated Aug. 13, 1974. Disclaimer filed Dec. 21, 1976, by the assignee, *Kvaerner Brug AS*.

Hereby enters this disclaimer to the term subsequent to July 18, 1989.

3,890,016.—*James T. Stull*, Jackson Township, Pa. BEARing CONSTRUCTION FOR IDLER ROLLS AND MAINTENANCE METHOD FOR IDLER ROLL BEARINGS. Patent dated June 17, 1975. Disclaimer filed Jan. 26, 1977, by the assignee, *United States Steel Corporation*.

Hereby enters this disclaimer to claims 1 to 10 of said patent.

3,895,056.—*Ruth E. Billings*, Indianapolis, *Robert E. McMahon*, Greenwood, and *Albert Pohland*, Indianapolis, Ind. ALPHA-DI-4-ACETOXY-1-METHYL-3,3-DIPHENYLHEXYLAMINE AND SALTS. Patent dated July 15, 1975. Disclaimer filed Jan. 26, 1977, by the assignee, *Eli Lilly and Company*.

Hereby enters this disclaimer to claims 1 and 2 of said patent.

3,899,938.—*Elmer R. Crabb*, Pekin, Ill. PLANETARY TORQUE PROPORTIONAL DIFFERENTIAL. Patent dated Aug. 19, 1975. Disclaimer filed Nov. 11, 1976, by the assignee, *Caterpiller Tractor Co.*

Hereby enters this disclaimer to claim 1 of said patent.

3,909,902.—*Robert W. Peters*, Milwaukee, Wis. CELL INSERTING MACHINE. Patent dated Oct. 7, 1975. Disclaimer filed Jan. 19, 1977, by the inventor.

Hereby enters this disclaimer to claims 1 through 11 of said patent.

3,915,174.—*Thomas A. Preston*, Seattle, Wash. PACING APPARATUS AND IMPROVED CATHETER. Patent dated Oct. 28, 1975. Disclaimer filed Jan. 5, 1977, by the inventor.

Hereby enters this disclaimer to the term subsequent to July 8, 1992.

3,920,525.—*Howard A. Fromson*, Weston, Conn. PROCESS FOR CONTINUOUSLY ANODIZING ALUMINUM. Patent dated Nov. 18, 1975. Disclaimer filed Jan. 24, 1977, by the inventor.

Hereby enters this disclaimer to claim 1 of said patent.

4,001,786.—*Arthur F. Boehm*, Roseville, Minn. AUTOMATIC CONFIGURATION OF MAIN STORAGE ADDRESSING RANGES. Patent dated Jan. 4, 1977. Disclaimer filed Jan. 24, 1977, by the assignee, *Sperry Rand Corporation*.

Hereby enters this disclaimer to claims 1 through 19 of said patent.

Dedications

3,586,196.—*Raymond W. Barton* and *Joe Thomas Herfon*, Evansville, Ind. NURSER. Patent dated June 22, 1971. Dedication filed Jan. 19, 1977, by the assignee, *Mead Johnson & Company*.

Hereby dedicates to the Public the remaining term of said patent.

3,173,086.—*James S. Kresge*, Rome, Ga. APPARATUS INCLUDING MECHANICAL VIBRATION DETECTOR MEANS FOR DETECTING AND LOCATING INCIPIENT INTERNAL FAULTS IN ELECTRIC INDUCTION APPARATUS. Patent dated Mar. 9, 1965. Dedication filed Jan. 7, 1977, by the assignee, *General Electric Company*.

Hereby dedicates to the Public the entire term of said patent.

Disclaimer and Dedication

3,898,322.—*Bruce E. Leach*, Ponca City, Okla. ALUMINA HAVING A BINODAL PORE VOLUME DISTRIBUTION. Patent dated Aug. 5, 1975. Disclaimer and dedication filed Jan. 19, 1977, by the assignee, *Continental Oil Company*.

Hereby disclaims and dedicates to the Public claims 1 through 5, inclusive, of said patent.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JANUARY 29, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	6-17-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	6-16-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	1-2-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	4-22-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	2-20-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	10-15-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	3-1-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	1-2-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	8-6-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	4-2-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	7-23-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	3-26-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	7-2-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	5-3-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	2-2-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	7-1-76

Expiration of patents: The patents within the range of numbers indicated below expire during February 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,923,008 to 2,926,351, inclusive
Plant Patents..... Numbers 1,901 to 1,918, inclusive

REISSUES

MARCH 8, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

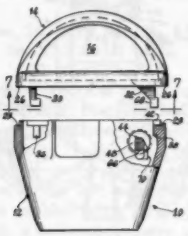
Re. 29,146
HOUSING FOR COIN OPERATED CONSTRUCTIONS

George I. Wimpffen, Wheaton, Ill., assignor to Qonaar Corporation, Elk Grove Village, Ill.

Original No. 3,782,142, dated Jan. 1, 1974, Ser. No. 276,704, June 31, 1972. Application for reissue Nov. 28, 1975, Ser. No. 636,038

Int. Cl.² E05B *65/52*

U.S. Cl. 70—170 **26 Claims**



1. In a coin handling construction wherein a housing is provided with a cap for closing access to the interior of the construction, the improvement comprising locking means for securing said cap in place on said housing, said locking means including a rotatable rod positioned within said housing, first locking elements mounted on said cap, second locking elements mounted on said housing, each of said locking elements defining a surface for inter-engagement to thereby prevent separation of the cap and housing, and means defined by said rod for contact with said cap, said rod being rotatable between a first position in contact with said cap whereby said cap is maintained with said elements inter-engaged, and a second position whereat said cap is free for movement to disengage said elements.

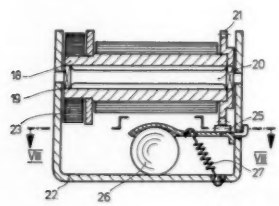
Re. 29,147
ENERGY ABSORBER FOR AUTOMOBILE SAFETY BELTS

Ernst Fiala, Berlin, Germany, assignor to Repa Feinstanzwerk GmbH, Industriegebiet, Germany

Original No. 3,741,494, dated June 26, 1973, Ser. No. 146,887, May 26, 1971. Application for reissue June 20, 1975, Ser. No. 588,635

Int. Cl.² A62B *35/00*; B65H *75/48*

U.S. Cl. 242—107.4 A **17 Claims**



1. Energy absorber for restraining systems in passenger vehicles comprising a take-up member, a force-transmitting member and a mounting rotatable relative to said take-up member, and an elongated *plastically deformable* torsion bar rotated about its longitudinal axis between said mounting and said take-up member for absorbing large amounts of energy when the take-up member rotates relative to the mounting.

Re. 29,148
COLOR PHOTOGRAPHIC DIFFUSION TRANSFER PROCESS

Yoshinobu Yoshida, and Atsuaki Arai, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Original No. 3,849,131, dated Nov. 19, 1974, Ser. No. 388,670, Aug. 15, 1973. Application for reissue Sept. 17, 1975, Ser. No. 614,468

Claims priority, application Japan, Aug. 17, 1973, 48-82274

Int. Cl.² G03C *7/00, 5/54, 1/40, 5/30*

U.S. Cl. 96—3 **6 Claims**

1. A color photographic diffusion transfer process comprising:

imagewise exposing a photographic material having at least one silver halide emulsion layer and a dye developer present adjacent to the silver halide in said silver halide emulsion layer and

treating said photographic material in superposed relation with an image-receiving material with an alkaline processing solution whereby the dye developer at the exposed portions of the silver halide emulsion layer is immobilized and the dye developer at the unexposed portions of the silver halide emulsion layer is transferred by diffusion to the image-receiving material, said treatment with said alkaline processing solution being in the presence of 6,6′,7,7′-tetrahydroxy-4,4,4′,4′-tetramethyl-bis-2,2′-[spirocumarone] *spirochroman.*

Re. 29,149
PRODUCTION OF AMMONIUM PHOSPHATES AND PRODUCT THEREOF

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

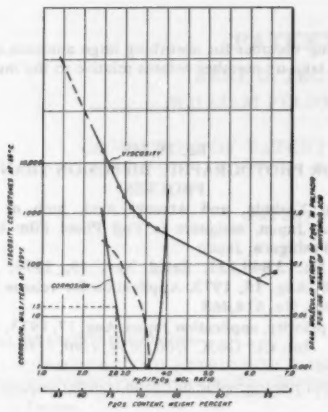
Original No. 3,044,851, dated July 17, 1962, Ser. No. 116,161, June 9, 1961. Continuation of Ser. No. 264,008, Feb. 11, 1963, abandoned, said Ser. No. 116,161, is a division of Ser. No. 51,047, Aug. 22, 1960, Pat. No. 3,192,013, which is a continuation-in-part of Ser. No. 649,287, March 29, 1957, abandoned, and Ser. No. 666,479, June 18, 1957, abandoned, and Ser. No. 672,558, July 18, 1957, abandoned. Application for reissue July 3, 1967, Ser. No. 653,602

Int. Cl.² C01B *25/28*

U.S. Cl. 423—313 **6 Claims**

11. A process for the production of a high-analysis liquid mixed fertilizer which comprises the steps of continuously feeding commercially available wet-process phosphoric acid containing up to about 54 weight percent P_2O_5 into evaporating means; continuously and simultaneously applying heat to said evaporating means; withdrawing from said evaporating means a highly concentrated, fluid, wet-process phosphoric acid substantially free of solids, containing about 65 to 70 weight percent P_2O_5, and containing in solution substantially all of the congeneric impurities ordinarily present in said commercially available wet-process acid fed to said evaporating means and sufficient acylic polyphosphoric acid to prevent precipitation of said impurities upon neutralization of said acid with ammonia; cooling said concentrated acid to a temperature of about 20°

to 40°C.; subsequently introducing ammoniating fluid to said highly concentrated acid in quantity sufficient to raise the pH of the resulting solution to about 7; maintaining the



resulting solution of unhydrolyzed ammonium salts at a temperature in the range from about 30° to 100°C. during introduction of said ammoniating fluid; and withdrawing the resulting solution as product.

Re. 29,150

CONVERGENCE COIL ASSEMBLY FOR COLOR TELEVISION

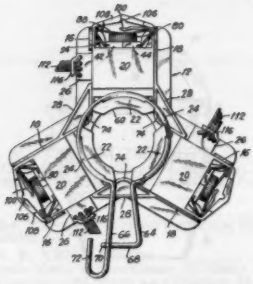
John T. Harten, Longmeadow, and Frank J. Zoladz, Williamansett, both of Mass., assignors to General Instrument Corporation, Clifton, N.J.

Original No. 3,496,501, dated Feb. 17, 1970, Ser. No. 639,833, May 19, 1967. Application for reissue Nov. 28, 1975, Ser. No. 636,125

Int. Cl.² H01F *7/00*

U.S. Cl. 335—212 **15 Claims**

1. A convergence coil assembly for color television comprising a frame plate **[** having **]** *with* a hole large enough to receive the neck of a color tube of maximum contemplated diameter **[**,**]** and having a plurality of **[** substantially equally spaced **]** guide means fixed thereon and **[** spaced circumferentially **]** *substantially equally circumferentially spaced* about said hole, *and extending generally radially with respect to said hole*, and a plurality of housings operatively connected to **[** the **]** *said* guide means *respectively* and movable within said guide means toward and away from said hole, magnet means operatively connected to said **[** housing, and means acting on



said housings to urge them radially inward toward said hole to adjust the positions of said housings for tube necks of different diameters, said guide means being fixed during the movement of said housings thereby to maintain the relative spaced positions about said hole of said housings and magnet means during said movement **]** *housings, flanges on said housings adjacent the inner ends thereof, and a clamp ring engaging said flanges and active to urge them and their respective housings towards one another and against the tube.*

PLANT PATENTS

GRANTED MARCH 8, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,021
APPLE TREE

William E. Dalton, Rte. No. 2, Box 252, Hendersonville, N.C. 28739

Filed Nov. 24, 1975, Ser. No. 634,441
Int. Cl.[2] A01H *5/03*
U.S. Cl. Plt.—34 **1 Claim**

1. A new and distinct variety of apple tree, substantially as herein shown and described, characterized particularly as to novelty by a general resemblance in some respects to the variety "Golden Delicious" (unpatented), but being principally distinguished therefrom by a semi-dwarf habit of growth, with crotch angles of almost 90°; a more spreading spur type fruiting habit which enables better development and easier picking of the fruit; a larger and more uniform fruit size throughout the tree, with most of the fruit grading tray-pack or extra fancy; excellent russet resistance (at least 95% free of russetting) far superior to the normally heavy russetting of the variety "Golden Delicious;" an attractive golden yellow fruit color which has a distinctive and attractive reddish blush even at low altitudes; better hardiness than "Golden Delicious," with the ability to withstand lower temperatures during the blooming period; a more prolific fruit bearing habit than "Golden Delicious" when grown under the same climate and soil conditions; a longer harvest period usually ranging for about a full month, beginning in early September and continuing into early October at Hendersonville, N.C.; and a self-fertile habit, with a suitability for use as a pollinator for other varieties.

4,022
STRAWBERRY PLANT

Harold A. Johnson, Jr., Watsonville, Calif., assignor to Driscoll Strawberry Associates, Inc., Watsonville, Calif.

Filed Apr. 7, 1976, Ser. No. 674,472
Int. Cl.[2] A01H *5/03*
U.S. Cl. Plt.—49 **1 Claim**

1. The new and distinct variety of strawberry plant herein described and illustrated, and identified by the characteristics enumerated above.

PATENTS

GRANTED MARCH 8, 1977

ERRATA

For CLASS	See PATENT NO.
016–087.2	4,010,503
016–158	4,010,504
028–001.2	4,010,529
051–284	4,010,583
134–104	4,010,774
259–006	4,010,932
065–134	4,011,060
071–029	4,011,061
071–092	4,011,062
358–261	4,011,399
358–127	4,011,400
358–212	4,011,401
358–213	4,011,402
358–209	4,011,403
358–185	4,011,404
361–047	4,011,483
361–059	4,011,484
361–127	4,011,485
361–182	4,011,486

PATENTS

GRANTED MARCH 8, 1977

ERRATA

PATENTS

GRANTED MARCH 8, 1977

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

4,010,494

CANINE EAR IMPLANT AND METHOD FOR SUPPORTING DEFECTIVE AURICULAR CARTILAGE

Barry W. Sauer, Central, S.C., assignor to Glasrock Products, Inc., Atlanta, Ga.

Filed Aug. 15, 1975, Ser. No. 605,006
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1 **5 Claims**

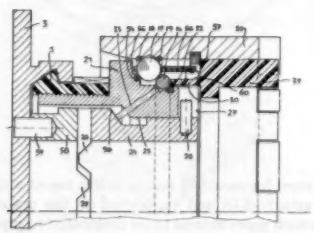
1. Canine ear implant for strengthening a defective auricular cartilage of a canine ear, comprising a sheet of flexible polymeric material adapted in size and shape to be positioned adjacent to either side of the auricular cartilage, the polymeric material having a density of at least 0.912 g./c.c. and being porous throughout and comprising a network of interconnected pores with no straight paths longer than the diameter of the largest pore, the minimum pore volume being 30% and the average pore diameter being 20 μm - 300 μm, the sheet having a thickness of at least 20/1000 in.

4,010,495

ARTIFICIAL WRIST AND ARM PROSTHESIS

Eduard Horvath, Vienna, Austria, assignor to Otto Boch Orthopadische Industries KG, Duderstadt, Germany

Filed May 15, 1974, Ser. No. 470,080
Claims priority, application Austria, May 17, 1973, 4334/73
Int. Cl.² A61F *1/06*
U.S. Cl. 3—12.4 **52 Claims**



1. An artificial wrist for connecting an arm prosthesis shaft to an implement which comprises

distal retaining means;

a proximal retaining member adapted to extend into said prosthesis shaft and formed with first and second engaging surfaces;

locking means interlocking with said distal retaining means and said first engaging surface to hold said distal retaining means and said proximal retaining member axially together;

a sliding surface bearing adapted to rotatably connect an implement to said distal retaining means;

rotatable coupling means which engage said second engaging surface and are adapted to engage said prosthesis shaft, said distal retaining means comprising a distal retaining member,

one of said distal and proximal retaining member being provided a track which is engageable by said locking means,

said locking means being carried by the other of said distal and proximal retaining members; and

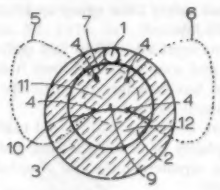
an adjusting mechanism operable to move said locking means in a substantially radial direction into and out of engagement with said track.

4,010,496

BIFOCAL LENS WHICH POSITIONS WITHIN THE ANTERIOR CHAMBER

Charles W. Neefe, P.O. Box 429, Big Spring, Tex. 79720

Filed Oct. 1, 1975, Ser. No. 618,382
Int. Cl.² A61F *1/16, 1/24*
U.S. Cl. 3—13 **1 Claim**



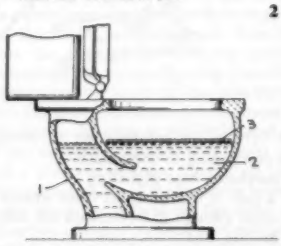
1. An implantable bifocal intra-ocular lens for the anterior chamber of the eye comprising a lenticular shaped body having a transparent optical portion provided with an upper distant refractive segment and a lower near refractive segment, lens support means extending outwardly and rearwardly from said body for positioning through the pupil and posterior to the iris with said body to be positioned anterior to the iris, at least one floatation void at the upper edge of said body whereby when said lens is implanted in the eye it will be positioned at the upper edge of the pupil when the pupil is either dilated or constricted and said near refractive segment will be within the pupil when it is dilated and said near refractive segment will be substantially below the pupil when it is constricted.

4,010,497

TOILET SPLASH GUARD

Philip Menter, 503 Hillsboro Parkway, Syracuse, and Herbert Bauer, 206 Stoneridge Drive, Dewitt, both of N.Y. 13214

Filed May 20, 1974, Ser. No. 471,703
Int. Cl.² A47K *17/00*
U.S. Cl. 4—1 **2 Claims**



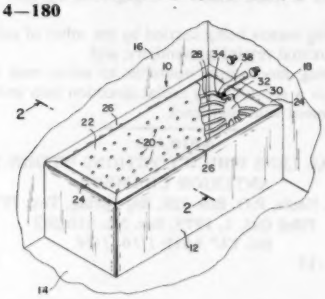
1. An anti-splash device comprising biodegradable paper in

sheet form shaped to conform to the area of the exposed surface of the water contained in a commode and floatable on the water surface, said paper including precut means dimensioned to allow the passage of human excreta therethrough.

4,010,498
BATHTUB SAFETY LINER-SPRAY APPARATUS

Frank W. Jablonski, Miami Springs, Fla., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Feb. 6, 1976, Ser. No. 655,788
Int. Cl.[2] A47K 3/00; A61H 33/02
U.S. Cl. 4—180 **7 Claims**



1. A bathtub safety liner spray apparatus comprising:
   a. a primary layer;
   b. a resilient layer bonded to said primary layer;
   c. a water and soap repellent liner bonded to said resilient layer and having edges of sufficient length to overlap a conventional bathtub;
   d. a network of tubing within said resilient layer;
   e. a multiplicity of water jets inserted through said water and soap repellent liner and coupled to said tubing network; and
   f. a coupling member connector to said tubing network and adapted to cooperate with a conventional bathtub faucet.

4,010,499
INVALID TRANSPORT

Alden B. Davis, 8022 E. Whitton Ave., Scottsdale, Ariz. 85252; Earl S. Dutmers, 107 W. Broadway, Moulton, Iowa 52540, and Mariane L. Englund, 1627 W. Pierson, Apt. 3, Phoenix, Ariz. 85015

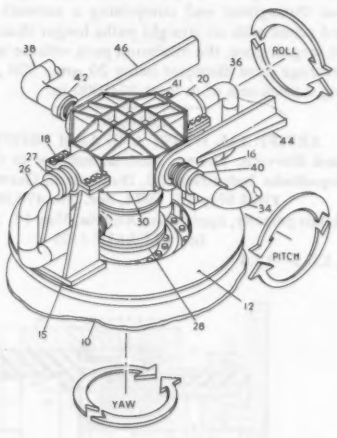
Filed July 17, 1975, Ser. No. 596,580
Int. Cl.[2] A47C 7/50; A47B 83/04; A61G 5/00
U.S. Cl. 5—81 R **3 Claims**

1. A vehicle for transporting an invalid passenger, said vehicle comprising in combination:
   a. a moveable base including
      1. a pair of spaced apart front wheels having a diameter small enough to fit beneath the side frame of an automobile, and
      2. a pair of spaced apart rear wheels having a diameter larger than the diameter of said front wheels;
   b. a pedestal connected to the rear of said base and extending upward at a frontward angle of less than 90° therefrom;
   c. a seat cantilevered frontward from said pedestal for supporting the back and legs of an invalid;
   d. a leg rest extending frontward from said seat and located at a downward angle from said seat for supporting the calves of said invalid, thereby maintaining the heels of said invalid above the top of said front wheels;
   e. means for selectively tilting said seat relative to said base;
   f. means for selectively raising and lowering said seat relative to said base; and
   g. a pair of arm rests connected to said seat and individually moveable to a position which does not obstruct access to the side of said seat.

4,010,500
MOORING TERMINAL

William R. Reid, Jr., Northridge, Calif., assignor to Imodco, Inc., Los Angeles, Calif.

Filed Oct. 28, 1975, Ser. No. 625,862
Int. Cl.[2] B63B 21/00
U.S. Cl. 9—8 P **7 Claims**

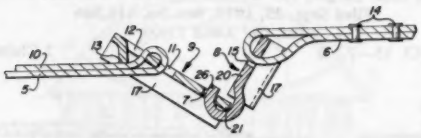


1. A system for mooring a ship to the top of a rigid column which is attached to and supported on the ocean floor and through which pipes extend to be connected to pipes on a ship moored thereto comprising
   a pair of yoke arms extending from the top of said column to a ship to be moored,
   mooring means connected between said pair of yoke arms and the top of said column including means at the top of said column for affording accommodation to the motion of a ship moored to said yoke arms about at least three orthogonal axes of rotation, and
   pipe means coupling the pipes extending through said column to said pipes on said ship, said pipe means including means for affording accommodation to the motion of said ship about the same three orthogonal axes of rotation as said mooring means.

4,010,501
TWO-PIECE BUCKLE AND ITS USE ON BODY-BUOYING EQUIPMENT

Lawrence G. Cooke, Ashland, Ohio, assignor to Eagle Rubber Co., Inc., Ashland, Ohio

Filed Sept. 2, 1975, Ser. No. 609,273
Int. Cl.² A44B *13/00*; B63C *9/08*
U.S. Cl. 9—338 9 Claims

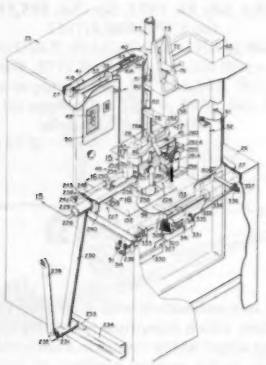


1. A two-piece buckle which includes a rigid first piece with a hook having a turned back outer end extending from a substantially flat base portion, a rigid second piece with a slot across the same for engagement by the hook, the slot being substantially straight and so spaced from the edge of the second piece that the portion of the piece between the slot and this edge, referred to herein as the engageable portion, is longer than the narrowest portion of the mouth of the hook, with the hook opening widening inwardly from the mouth to a width greater than the width of said engageable portion and the entire portion of the second piece being substantially flat from said end throughout the area that includes the slot so that said engageable portion must be at an angle of less than 90° to said base in order for the slot to become engaged by the hook and disengaged therefrom; the slot being so narrow that when the pieces are substantially parallel, it is not long enough to fit over the turned-back outer end of the hook.

4,010,502
APPARATUS FOR EDGE PROCESSING WORK AND PARTICULARLY NON-CIRCULAR WORK

Richard D. Cushing, Newton, and Alfred E. Beck, Jr., Exeter, both of N.H., assignors to Circle Machine Co., Inc., Seabrook, N.H.

Filed May 15, 1975, Ser. No. 577,722
Int. Cl.² A43D *7/00*
U.S. Cl. 12—86.7 64 Claims

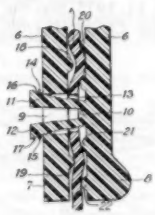


1. Apparatus for removing material from the periphery of work to impart thereto a predetermined, non-circular size and shape, said apparatus comprising a rotatable work holder including a non-circular template of at least the wanted shape, means operable to remove material from the periphery of the work including at least one tool portion operable to remove material from the periphery of the work and a second portion engageable by the periphery of the template when the unwanted material is removed from the work, a drive operable to so rotate said work holder that the periphery of the non-circular work advances into contact with the tool at a controlled rate, said work holder drive including driving means and a driven member rotatable with the work holder and including a non-circular wall portion that is of a shape to effect said rate and with which the driving means is continuously engaged, said driving means in engagement with said wall portion and means operable to permit relative movement between said work holder and the tool as the work holder turns, the driven member advancing relative to the tool at a constant rate and the rate at which the template advances relative to the tool depending on any difference between its shape and that of said wall portion.

4,010,503
SHOWER CURTAIN FASTENING DEVICE

Ron Denton, Portland, Oreg., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Feb. 12, 1976, Ser. No. 657,371
Int. Cl.² E05D *13/02*
U.S. Cl. 16—87.2 2 Claims

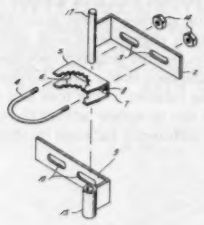


1. A shower curtain fastening device for releasably affixing a shower curtain to a curtain rod, said shower curtain having a plurality of spaced holes formed therethrough to facilitate fastening it to the curtain rod, said fastening device comprising

a strip of substantially flexible material of band-like configuration having first and second spaced opposite ends, a hole being formed through the strip in the area of its first end, said strip being adapted to hang over a curtain rod for a shower curtain with its first and second ends in proximity; and

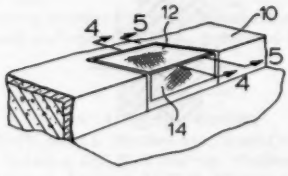
a fastening member comprising a substantially U-shaped member of substantially resilient material having a head end affixed to the strip in the area of the second end thereof and a pair of arms diverging away from each other and from the head end and transversely from the strip whereby when the arms of the fastening member are manually pressed toward each other they pass through a hole through the shower curtain and the hole through the strip and when said arms are released they spread apart to secure said fastening member in said hole; and wherein the arms of the fastening member have outer opposite surfaces, and a plurality of steps formed on the outer opposite surface of each arm of the fastening member and rising vertically along the axis of the fastening member and with the series of steps on each arm mutually converging toward the head end for gripping the strip around the hole therethrough.

4,010,504
GATE HINGE
Ronald G. Griffin, 1616 W. 13th, Houston, Tex. 77008
Filed July 3, 1975, Ser. No. 582,995
Int. Cl.² E05D *5/02*
U.S. Cl. 16—158 **4 Claims**



1. A gate hinge having a male and female member, elongated slots in said members, U-bolts having their respective ends externally threaded and adapted to extend through said slots, post gripping means mounted on said U-bolts and abutting said hinge members, and means on said male and female members for pivotally engaging said male and female members.

4,010,505
DOCKBOARDS
Willem J. Bouman, Toronto, Canada, assignor to Richards-Wilcox of Canada Limited, London, Canada
Filed Sept. 11, 1975, Ser. No. 612,558
Int. Cl.² E01D *1/00*
U.S. Cl. 14—71.3 **13 Claims**



1. A dockboard comprising frame means; a main plate having a front edge; means pivotally connecting the main plate with the said frame means for pivoting movement about a respective first pivot axis; a lip plate; means mounting the lip plate at the main plate front edge for movement relative to the main plate between a stored position and an operative extended position; and lip-extending means operative to move the lip plate from its stored position to its operative position upon downward movement of the main plate about the said first pivot axis; the lip-extending means comprising:

an arm operatively connected with the said lip plate and movable therewith;

guide means mounted to the frame means engaging the arm and guiding it for longitudinal movement and also permitting pivoting movement of the arm relative to the frame means;

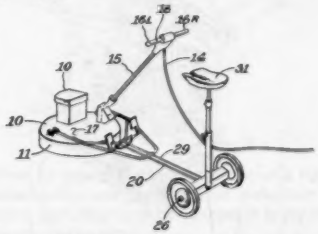
and latch means comprising cooperating latch members on respectively the arm and the frame means and engagable with one another upon movement of the main plate to an upper position so that downward movement of the main plate from the upper position will cause the arm to extend the lip plate;

the said first means latch member being movably mounted on the frame means for movement such as to maintain operative engagement of the latch during the downward movement of the main plate from said upper position and to permit disengagement of the latch at a lower position above where the extended lipplate can engage a truck in front of the dockboard.

4,010,506
OSCILLATING TOOTHBRUSH
Stuart Jay Young, 310 Lexington Ave., New York, N.Y. 10016, and Isaac Berger, 159 W. 58th St., New York, N.Y. 10019
Filed Sept. 25, 1975, Ser. No. 616,566
Int. Cl.² A46B *13/08*
U.S. Cl. 15—2[illegible] R **2 Claims**

1. An oscillating toothbrush comprising a brush head, a shank integrally connected to said brush head with said brush head being offset from said shank, a pair of oppositely projecting removable pin surfaces extending from said shank and adaptable to move in and out of cooperating helical slots, a cylindrical handle member substantially enclosing said shank, one end of said cylindrical handle terminating in a removable circular stop surface with an aperture formed at the center thereof, said circular stop preventing the pin surfaces from moving out of said slots, the end of said shank at said one end of said cylindrical handle forming a cooperating stop surface larger than said aperture and adapted to abut against said circular stop surface, whereby during assembly the shank may be inserted into the cylindrical handle member and the pair of pin surfaces inserted into the shank, the shank pins inserted into the helical slots and the removable stop surface secured to the cylindrical handle member to allow the pins to be moved only within the slots.

4,010,507
RIDING ATTACHMENT TO FLOOR BUFFER MACHINE
Ruben M. Johnson, Courtland, Kans., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest
Filed July 14, 1975, Ser. No. 595,513
Int. Cl.² A47L *11/162*
U.S. Cl. 15—49 R **1 Claim**

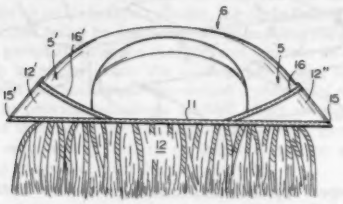


1. For use in combination with a circular rotatable wheel buffing machine which comprises a housing enclosing a motorized buffing wheel which rotates in a horizontal plane about a vertical axis in the normal position of said machine, an attachment comprising a U-shaped yoke frame, said frame terminating in two spaced legs, said legs being pivotably fastened to the housing of the buffing machine on opposed horizontal sides of the vertical axis of rotation of the buffing wheel, a tow bar having a front end and a rear end, said bar being fixed at said front end to said frame, said rear end of said tow bar being supported by wheel means, and a vertical seat support structure mounted on said rear end of said tow bar.

4,010,508
MOP SUITED FOR DUSTING CURVED SURFACES

Toshiyoshi Komatsu, Osaka, Japan, assignor to Duskin Franchise Co., Ltd., Osaka, Japan

Filed Feb. 20, 1976, Ser. No. 659,904
Int. Cl.² A47L 13/24; B25G 1/02
U.S. Cl. 15—104.94 6 Claims

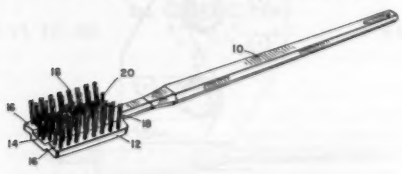


1. A handy mop comprising a mop holder and a mop swab; said mop holder being composed of an integrally molded resilient, foamed product having independent cells inside thereof and a non-permeable continuous skin layer on the outer surface; said mop holder having a convex spherical upper surface and a concave spherical lower surface; said mop holder having sides that are symmetrical in the lengthwise axial direction and concave toward the inside, so that there is formed in the mop holder a grip extending in the lengthwise direction at the central part thereof and a pair of mop holding parts having an arcuate tip and a horse-shoe-shaped bottom at each end integrally with said grip; the bottom surfaces of said mop holding parts being positioned below the grip; the lateral size of said grip being smaller than that of said mop holding parts; said mop holder having resiliency and flexibility sufficient to enable the pair of mop holding parts to be deflected inwardly and downwardly; said mop swab being composed of an oval base cloth, a number of mop cords fastened to the lower surface of said base cloth and impregnated with a dusting oil composition, and a pocket provided at the upper surface and at each end of said base cloth; the holding parts of said mop holder being inserted into the pockets of said mop swab to attach the mop swab to the mop holder; said mop holder in a state attached to the mop swab having a curvature larger than that in a free state; and a space sufficient to insert the fingers of the operator being formed between the grip and the base cloth.

4,010,509
DOUBLE SULCUS TOOTHBRUSH

Frederic G. Huish, 3771 Ingraham St., San Diego, Calif. 92109

Continuation-in-part of Ser. No. 635,245, Nov. 25, 1975, abandoned. This application Jan. 9, 1976, Ser. No. 647,998
Int. Cl.² A46B 9/04
U.S. Cl. 15—167 R 1 Claim

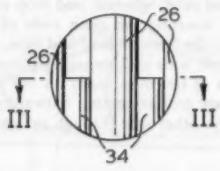


1. A double-acting sulcus toothbrush comprising:
a. an elongated handle;
b. a head integral with one end of said handle and having a forward face;
c. an elongated, central bristle group longitudinally extended on said face;
d. two longitudinally extended elongated sulcus bristle groups embedded in the forwarded face of said head on opposite sides of said central bristle group the bristles of said sulcus bristle groups being mutually divergent and having ends extending forwardly beyond the bristles of said central bristle group.
e. the forward face of said head having a flat central area and two rearwardly sloped lateral shoulders;
f. said central bristles being embedded in said central area and said sulcus bristles being embedded generally orthogonally into said shoulders, said flat central area being rearwardly recessed relative to said shoulders.

4,010,510
PAINT BRUSH AND THE LIKE

George S. Belza, 22 Carney Road, Willowdale, Ontario, Canada (M2M 1T2)

Filed Mar. 12, 1976, Ser. No. 666,276
Int. Cl.² A46B 3/02
U.S. Cl. 15—192 13 Claims

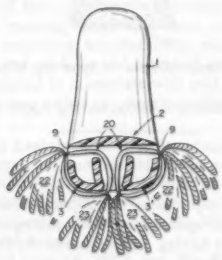


1. A paint brush and the like comprising:
a handle,
a ferrule secured to the handle;
a plurality of bristles having inner end portions received within the ferrule and outer end portions which project from the ferrule;
a bristle setting material retaining the bristles within the ferrule;
a plurality of elongate spacer elements arranged inside the ferrule generally parallel to the inner end portions of the bristles and extending in length to substantially the level of said setting material, the bristles and spacer elements being tightly packed in the ferrule and the spacer elements being distributed between the individual bristles so as to mechanically and positively space the bristles and provide a predetermined bristle density.

4,010,511
MOP HAVING SLEEVE TYPE DETACHABLE MOP HEAD

Toshiyoshi Komatsu, Osaka, Japan, assignor to Duskin Franchise Co., Ltd., Osaka, Japan

Filed Feb. 6, 1976, Ser. No. 656,081
Int. Cl.² A47L 13/24; B25G 1/00
U.S. Cl. 15—104.94 8 Claims



1. A handy mop comprising in combination (A) a mop holder including a grip, an upper holding plate and a pair of lower holding rods, all of which are integrally molded from a

plastic material, each of said upper holding plate and lower holding rods extending in the horizontal longitudinal direction and having a closed end and an open end, said upper holding plate having a substantially horizontal flat lower face, said lower holding rods being disposed so that they are spaced vertically from said upper holding plate by a small distance and laterally from each other in parallel to each other by a small distance, to thereby form a horizontal mop passage between the upper holding plate and the lower holding rods and a vertical mop passage between the pair of the lower holding rods, a pair of projections being disposed in the vicinity of the closed ends of the pair of the lower holding rods so that they narrow said vertical passage, and a mop head-fixing engaging piece mounted on said mop holder at a position outside the closed ends of said holding plate and rods; and (B) a mop head including a tube open at each end, extending in the longitudinal direction and being capable of receiving said holding rods in the state inserted therein, a plurality of rows of mop cords disposed integrally with said tube and composed of twisted yarns extending outwardly of both sides of the tube in the transverse direction, and a loop cord fixed to each of the open ends of said tube; wherein said mop is attached to said mop holder by inserting the open ends of the pair of said holding rods into the open ends of said tube, engaging the pair of said loop cords with said engaging piece, projecting outwardly the rows of the mop cords on one side through said horizontal passage and projecting outwardly the rows of the mop cords on the other side through the vertical passage.

4,010,512

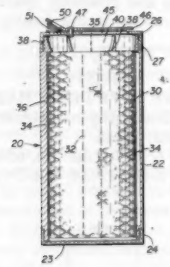
SELF-CONTAINED RECEPTACLE TYPE DIP STICK CLEANER

F. Clark Addison, and Lee Silk Addison, both of P.O. Box 2462, Estes Park, Colo. 80517

Filed Mar. 29, 1976, Ser. No. 671,120

Int. Cl.² G01F *15/12*

U.S. Cl. 15—210 B **8 Claims**



1. A self-contained receptacle type dip stick cleaner comprising

a. a flexible cylindrical body, having upper and lower open ends,

b. a core of absorbent material contained within said body and having an open center along its vertical axis,

c. a removable bottom closing the lower end of said body,

d. a removable top closing the upper end of said body, said top having an opening exposing the open center axis of said core and having a pivotable cover for the top opening, and

e. retaining means for holding said core at a predetermined distance from said top, creating an air space allowing the tool to be squeezed without forcing absorbed liquid from said core out of the tool.

4,010,513

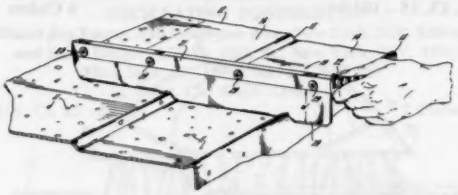
WIPER DEVICE FOR ARCUATE AND FLAT SURFACES

Ralph Sassi, 168 Ardmore, Des Plaines, Ill. 60016

Filed June 9, 1975, Ser. No. 585,253

Int. Cl.² A47L *1/06*

U.S. Cl. 15—245 **7 Claims**



1. A wiper apparatus for clearing moisture from both curved and flat surfaces comprising an elongated support member, a handle extending outwardly from an end of said support member, said handle and support member being formed of a unitary plastic piece, a relatively soft rubber elongated wiper blade having a thickness of about ⅛ inch, said support being formed with a channel-shaped cross-section including a pair of spaced parallel legs, means securing one elongated side of said wiper blade in said support member channel such that said wiper blade extends outwardly from said support member with the outer elongated side thereof defining a clearing edge, said wiper blade having a length of at least 12 inches and extends outwardly from said support member a distance of at least 1/10 of its length and has a durometer hardness rating of between 30 and 40 so that the clearing edge thereof can conform closely to both curved and flat surfaces over which it is passed for clearing substantially all moisture thereon, and said handle makes an angle of between 5° and 10° with respect to the longitudinal axis of said support member so that the outermost end of said handle is set back from the support axis on a side opposite that from which said wiper blade extends.

4,010,514

ARRANGEMENT FOR CONTINUOUSLY CLEANING FLEXIBLE LAYER SUBSTRATES IN TAPE FORM

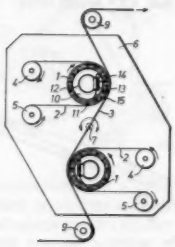
Josef Fischer; Johann Baarfüsser, and Helmut Maier, all of Munich, Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Mar. 31, 1975, Ser. No. 563,504

Claims priority, application Germany, Apr. 4, 1974, 2416419

Int. Cl.² B08B *5/04*

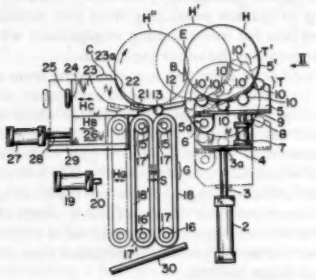
U.S. Cl. 15—306 A **6 Claims**



1. A suction roller arrangement for continuously cleaning surface-sensitive paper or film in web form movably disposed in a path of travel under tension, more especially photographic material and magnetic tapes, said arrangement including a cleaning surface of a travelling flexible ribbon material being in contact with a portion of the web surface to be cleaned, the other surface of the travelling flexible ribbon

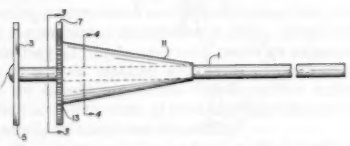
material being pressed in contact with the suction roller as the web portion passes under tension thereover, the travelling flexible ribbon material being non-woven and fibrous, and means for directing the travel of the flexible ribbon of fibrous non-woven material at a speed V_1, in the opposite direction to the direction of the web which travels at a speed V_2, the ratio between the respective rates of travel V_1:V_2 being between about 1 : 500 and 1 : 10,000, wherein the suction roller includes an outer hollow cylinder, the outer hollow cylinder of the suction roller having bores which are distributed over the entire peripheral surface thereof, and wherein an evacuation duct is arranged inside the suction roller and spaced at a sufficient distance from the hollow cylinder of the suction roller to provide a uniform suction effect on the ribbon in contact therewith, the evacuation duct being provided with bores only in the vicinity of the web portion and ribbon pressed in contact with the suction roller.

4,010,515
ANIMAL SKINNING APPARATUS
Nobuo Koyama, 238-8, Jone, Toride, Ibaragi, Japan
Filed Oct. 9, 1975, Ser. No. 621,251
Int. Cl.² A22B *5/16*
U.S. Cl. 17—21 **11 Claims**



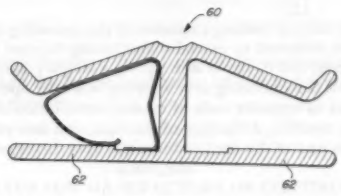
1. An animal skinning apparatus comprising a roller table for supporting the body of a hog or other like animal which can be moved in elevational movement and at the same time can be moved in tilting motion in a plane normal to its axis, a transfer and support table disposed adjacent said roller table, a guide roller disposed adjacent said transfer and support table, a cutter head mounting a cutter and juxtaposed against the guide roller, said cutter head being movable toward and away from the guide roller, and two sets of endless chains arranged beneath the line of contact between the cutter and the guide roller and adapted to pull the skin stripped from the body of the hog by means of the cutter.

4,010,516
FISH SCALING DEVICE
Rayburn J. Campbell, P.O. Box 1475, Pearland, Tex. 77581
Filed Sept. 16, 1975, Ser. No. 613,930
Int. Cl.² A22C *25/02*
U.S. Cl. 17—66 **4 Claims**



1. A fish scaling device comprising an elongated, cylindrical handle, a generally rectangular hold down plate affixed to one end of said handle and perpendicular thereto; a scaler plate slidably mounted on said handle for reciprocating movement along said handle; manually operable operator means connected to said scales plate whereby said scaler plate may be moved to and fro along said handle, said operator being of generally funnel-shaped configuration flaring open toward said scaler plate and being oval in cross section, said scaler plate having an oval opening therein with the longer axis of the opening being aligned with the longer axis of the oval, funnel-shaped end of the operator whereby said operator and said scaler plate may be swung in a generally arcuate path in at least one direction to accommodate variations in thickness and contour of the specimens being scaled as the operator traverses to and fro along said elongated, cylindrical handle.

4,010,517
SHEET SUPPORT APPARATUS
Odd B. Kapstad, 5 Minot Ave., Acton, Mass. 01720
Filed Sept. 12, 1974, Ser. No. 505,420
Int. Cl.² B42F *1/00*
U.S. Cl. 24—67.11 **9 Claims**



1. Sheet support apparatus, comprising:

a. an elongated, rigid frame, said frame including first, second and third wall members, said wall members having generally planar inner and outer wall surfaces, and said wall members being integrally connected and spaced to define an elongated cavity therebetween for receiving an edge of a sheet to be supported, said first wall member being substantially perpendicular to said third wall member and said second wall member meeting said third wall member at an angle of between about 50° and about 80°;

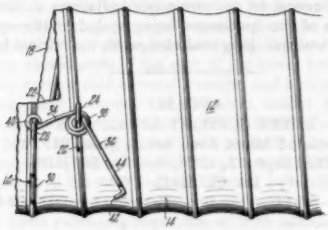
b. resilient anchoring means for anchoring a sheet edge within said cavity, said resilient anchoring means comprising a leaf spring having first and second terminal portions, said first terminal portion slanted towards said third wall member thereby making it easier to insert a sheet edge into its anchored position within said frame cavity than to withdraw it therefrom, said leaf spring also having one of its sides in substantially continuous contact with the inside surface of said second wall member and having another of its sides bent inwardly away from the inner surface of said third wall member; and,

c. means for retaining said resilient anchoring means within said cavity, said means for retaining comprising an indented slot forming a shoulder located on the inner surface of said first wall member contiguous to where said first wall member joins said third wall member, said shoulder extending longitudinally along said first wall member, and said second terminal portion of said leaf spring designed to cooperate with said shoulder to retain the leaf spring within the frame cavity.

4,010,518
CLAMP FOR FLEXIBLE DUCT
William E. Rejeski, Farmington, and Paul D'Aprile, Forestville, both of Conn., assignors to The Wiremold Company, West Hartford, Conn.
Filed June 16, 1975, Ser. No. 587,357
Int. Cl.² A44B *21/00*
U.S. Cl. 24—73 C **11 Claims**

1. For contracting and securing an end of a generally tubular flexible duct having a helically wound reinforcing member

maintaining the duct in a normally extended condition, a spring clamp comprising a continuous resilient wirelike body including an operating arm and a lever arm in offset angular relation to one another, an intermediate coil connecting the operating arm and the lever arm, the operating arm being reversely bent at its extremity relative to the coil to provide a self-locking extension of the operating arm projecting toward



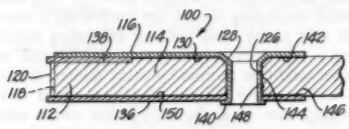
the coil, the self-locking extension of the operating arm having a length sufficient to extend diametrically beyond the center of the coil, and the lever arm having a length greater than the length of the operating arm whereby with the operating arm attached to opposite ends of an end convolution of the reinforcing member, deflection of the lever arm into engagement with the end of the duct reduces the duct diameter.

4,010,519

FASTENER STRUCTURES UTILIZING A THERMOPLASTIC ADHESIVE

Albert L. Worthing, Tustin, Calif., assignor to Shur-Lok Corporation, Santa Ana, Calif.

Filed Nov. 24, 1975, Ser. No. 634,665
Int. Cl.² A43C 5/00; F16B 19/04
U.S. Cl. 24—141 **4 Claims**



1. A fastener structure for use with a member having opposed surfaces and a hole extending between said surfaces which comprises:

a metal plate capable of conducting heat having an upper surface and a lower surface, said plate being adapted to be located with respect to said member so that said lower surface is adjacent to said member,

a metal shank means capable of conducting heat for use in securing said plate to said member, said shank means extending from said plate and being shaped so as to fit through said hole,

a continuous layer of a thermoplastic adhesive located on said metal parts, said layer being located so as to be adapted to be in engagement with said member as said fastener is located with respect to said member,

said metal in said plate and said shank means has a thermoconductivity k of at least 10 within the range of temperatures within which said adhesive is capable of being bonded by the application of heat,

said range of temperatures is from about 50° to about 200° C.,

said layers of adhesive are from about 0.005 to about 0.012 inch thick, and

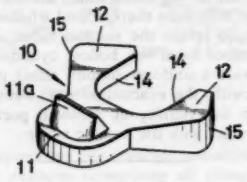
said adhesive is a nylon modified polyamide adhesive.

4,010,520

COUPLING ELEMENT FOR SLIDE FASTENER

Hiroshi Yoshida, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Feb. 24, 1976, Ser. No. 660,915
Claims priority, application Japan, Feb. 27, 1975, 50-27315[U]; Mar. 6, 1975, 50-27764
Int. Cl.² A44B 19/02
U.S. Cl. 24—205.13 R **2 Claims**



1. A coupling element for a slide fastener having a slider and a pair of element-carrying tapes, the coupling element being adapted to be mounted on either one of the pair of tapes, comprising:

a head portion of substantially uniform thickness;

a coupling projection projecting from one surface of said head portion for intercoupling engagement with a coupling element on the other tape; and

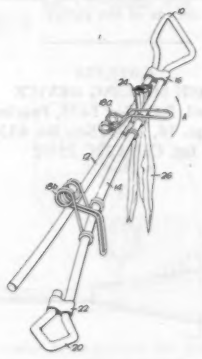
a pair of tape edge clamping legs extending from said head portion in spaced-apart relation to each other, said pair of legs having a pair of inner flat surfaces which face each other and are adapted to grip the tape edge in surrounding relationship therewith, and a pair of outer convex surfaces which face away from each other and with which the slider is slidably engageable when the latter is manipulated to open and close the slide fastener, each of said legs being transversely tapered from said outer surface toward said inner surface to provide trapezoidal transverse cross-sectional shape thereof.

4,010,521

MEANS FOR RETAINING ARTICLES

Emlyn John Powell, Salisbury, and James Strathearn Brown, Darwendale, both of Rhodesia, assignors to James Strathearn Brown, Darwendale, Rhodesia

Filed July 14, 1975, Ser. No. 595,431
Int. Cl.² A44B 21/00
U.S. Cl. 24—258 **6 Claims**



1. A device for retaining articles comprising at least two co-operating elongated members and at least one clip formed from a torsion spring having:

a. at least one outwardly extending arm the free end of which is mounted on one member, and

b. an outwardly extending hook adapted releaseably to engage another or the other member against the torque of the spring thereby gripping the article interposed the members.

4,010,522

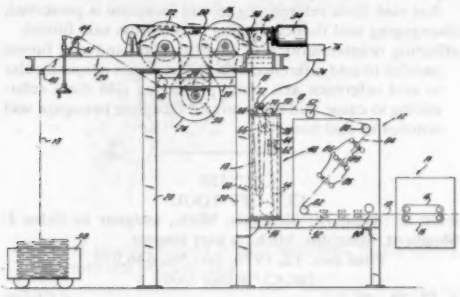
APPARATUS FOR DRYING WEB-LIKE MATERIAL

Peter Stanislaw, Stockholm, N.J., assignor to Morrison Machine Co., Paterson, N.J.

Continuation of Ser. No. 424,778, Dec. 14, 1973, abandoned. This application Dec. 29, 1975, Ser. No. 644,726

Int. Cl.² D06C *21/00*

U.S. Cl. 26—18.6 **7 Claims**



1. Apparatus for pre-shrinking first and second webs of material, including a compressor, first feeding means for feeding the first web of material into the compressor, second feeding means being arranged side-by-side to said first feeding means for feeding the second web of material into the compressor alongside said first web of material while the first feeding means is feeding the first web of material into the compressor, a first adjustable tension responsive control system for maintaining a first predetermined tension on the first web of material as it enters the compressor, and a second adjustable tension responsive control system being arranged side-by-side to said first adjustable tension responsive control system for maintaining a second predetermined tension on the second web of material as it enters the compressor to compensate for the differing characteristics of said first and second webs of material so that they enter said compressor with controlled tension characteristics and are each preshrunk to the desired extent in said compressor.

4,010,523

PROCESS FOR THE PRODUCTION OF A NOVELTY YARN

Karl-Hermann Hense, Erlenbach, and Thomas Zang, Hosbach, both of Germany, assignors to Akzona Incorporated, Asheville, N.C.

Filed July 23, 1975, Ser. No. 598,261

Claims priority, application Germany, July 27, 1974, 2436277

Int. Cl.² D02G *1/20*

U.S. Cl. 28—72.11 **10 Claims**

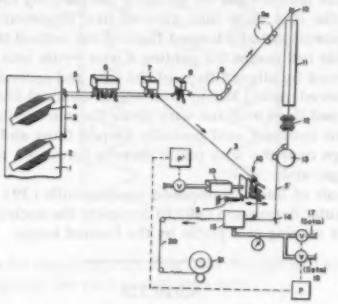
1. A process for the production of a composite novelty yarn which comprises:

conducting a continuous multifilament base thread together with a continuous multifilament fancy thread through a texturizing jet nozzle operating under an adjustable pressure of a fluid medium and being capable of inducing both an interlacing action and a suction action when applied to said threads, at least said base thread consisting essentially of texturized filaments;

varying the pressure of the jet fluid medium applied to said threads between a lower value above atmospheric pressure and a distinctly higher value;

maintaining a relatively high uniform tension on said base thread such that it follows a substantially linear path through the jet nozzle;

maintaining a distinctly lower tension by a light braking on the fancy thread as compared to the tension on the base thread, said light braking taking place during the application of said lower value of the jet pressure; and



maintaining the fancy thread practically tension-free and unbraked during the application of said higher value of the jet pressure.

4,010,524

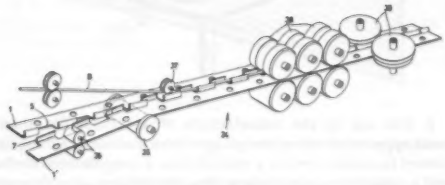
APPARATUS FOR MANUFACTURE OF CONTINUOUS HINGE

Akashi Osamu, No. 6-22, 5-chome, Momodani, Ikuno, Osaka, and Nakamura Masazo, No. 50, Taihoji-machi-higashinocho, Minami, Osaka, both of Japan

Filed Nov. 6, 1975, Ser. No. 629,373

Int. Cl.² B21D *53/40*; B21K *13/02*

U.S. Cl. 29—11 **1 Claim**



1. An apparatus for manufacturing a continuous hinge comprising:

a. an elongated work support having input and output ends disposed to define a travel path and to support first and second moving adjacent strips (**1, 1'**) on said travel path;

b. pay-off reel means for supplying first and second metal strips along said travel path for forming opposing leaves of a continuous hinge;

c. a press-machining station (**10**) including strip receiving roll means (**28**) for receiving and feeding each of the metal strips intermittently by a predetermined length, a pair of die means, each for simultaneously forming in each of the strips an outer side hole (**2**), notch (**5**) defining an inner flap (**3**) and a partially looped flap (**7**) by bending said flap (**3**) so that the notches and partially looped flaps in the first strip are offset from those for the second strip, each of said pair of die means including a punch (**12**) for forming the hole, a cutting block (**11**) for cutting the notch, a laterally slidable swaging die (**17**) biased away from the flap (**3**) defined by the notches and having an inwardly curved portion and a slant (**20**), an elevatable block having a curved projection (**16**) and a slant (**19**) for hitting and urging the swaging die towards the flap (**3**) by the slidable engagements of the slants (**19**) and (**20**) thereby forming the partially looped flap (**7**) by

the press of the inwardly curved portion of the swaging die mating the curved projection of the elevatable block which is lowered, and means for lowering the punch, cutting block and elevatable block at the same time in a timed relation with the stoppage of each of the strips;

d. roller means (**36**) for bringing the partially looped flaps of the first strip into channel-like alignment with the adjacent partially looped flaps of the second strip;

e. guide roll means for guiding a wire pintle into a channel formed by aligned flaps of the first and second strips;

f. grooved rolls (**38**) to which said channel-like partially looped flaps with the wire pintle therein are directed, so as to constrict said partially looped flaps and close the loops over the wire pintle thereby forming a continuous hinge; and,

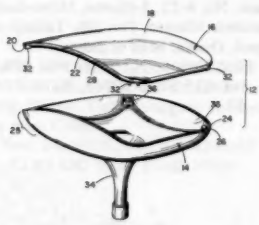
g. a pair of laterally opposed squeeze rolls (**39**) having an annular depression (**40**) to complete the encircling of the wire serving as a pintle by the formed loops.

4,010,525

METHOD FOR ASSEMBLING A FUNNEL AND A FLANGELESS FACEPLATE IN THE MANUFACTURE OF A COLOR TELEVISION PICTURE TUBE

Leslie L. Baur, Glen Ellyn, and Thaddeus J. Hajduk, Chicago, both of Ill., assignors to Zenith Radio Corporation, Chicago, Ill.

Filed May 3, 1976, Ser. No. 682,947
Int. Cl.² H01J 9/26
U.S. Cl. 29—25.13 **11 Claims**



1. For use in the manufacture of a rectangular shadow mask-type color television picture tube including a flangeless, curved faceplate having a central axis, a convex front surface, and a concave rear surface with a phosphor screen deposited on a central portion thereof, said faceplate also having four shadow mask suspension studs extending from said rear surface of said faceplate, one in each peripheral corner region of said faceplate, and a shadow mask suspended from said studs, said tube also including a funnel having a central axis and a neck attached to a rectangularly cross-sectioned flared portion, the flared portion having a seal land which mates with said concave rear surface of said faceplate, said seal land having deposited thereon a cement for sealing said faceplate to said funnel, the flared portion of said funnel also having corner notches in at least three corners of said funnel, said notches receiving said studs on said faceplate when said faceplate and funnel are assembled, said studs and said notches constituting an internal referencing system for said faceplate and said funnel, a method for assembling said faceplate to said funnel comprising:

orienting said faceplate, concave rear surface down, with said faceplate central axis parallel to a predetermined reference axis and said faceplate being angularly positioned to coincide with a predetermined faceplate theta position, said orienting being effected by engaging said studs on said faceplate with simulated funnel inside corner notches on a faceplate aligning means;

orienting said funnel, flared portion up, with said funnel central axis parallel to said predetermined reference axis and with said funnel angularly positioned to coincide with a predetermined funnel theta position, said orienting being effected by engaging said notches in said funnel with simulated studs on a funnel aligning means, said simulated studs and said simulated notches being theta-referenced each to the other, i.e., the angular orientation of each to the other is at all times known;

locking said faceplate such that said faceplate central axis is parallel to said predetermined reference axis, and such that said theta referencing to said funnel is preserved;

disengaging said faceplate aligning means from said faceplate;

locking said funnel such that said funnel central axis is parallel to said predetermined reference axis and such that said theta referencing to said faceplate is preserved;

disengaging said funnel aligning means from said funnel;

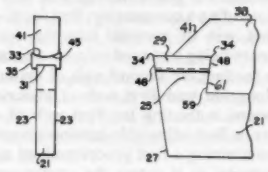
effecting relative motion of said faceplate and said funnel parallel to said reference axis and in planes perpendicular to said reference axis while preserving said theta referencing to cause said studs on said faceplate to engage said notches in said funnel.

4,010,526

CUT-OFF TOOL

Donald L. Shephard, Memphis, Mich., assignor to Helen I. Shepherd, Memphis, Mich., a part interest

Filed Jan. 12, 1976, Ser. No. 648,071
Int. Cl.² B26D 1/00
U.S. Cl. 29—96 **6 Claims**



1. A cut off tool comprising an elongated support blade of uniform thickness adapted for mounting in a tool holder;

a support head on and projecting above said blade at its forward end;

an elongated carbide insert of U shape in cross section wider than said support head and having an undercut slot mounted on and along the length of said head, with said head snugly extending into said slot, and said insert adapted for securing thereon, both lower edges of said insert bearing against side portions of said head;

said insert being of uniform cross section, having side walls tapering downwardly and inwardly;

its opposite end faces tapering downwardly and inwardly, its top surface being transversely concave along its length to define with an end face a concave leading cutting edge;

said insert top edge being hollow ground;

said insert after wear of its cutting edge, adapted for reversal end to end upon said head to provide a second cutting edge;

the leading edge face of said support blade being cut downwardly and rearwardly and coplaner with said insert leading edge face;

and means removably securing said insert upon said head.

4,010,527

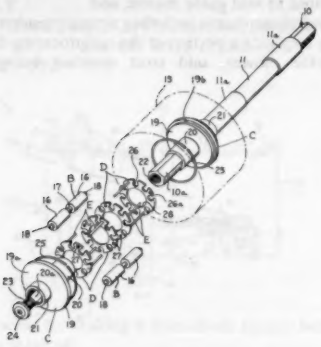
TEXTILE DRAFTING ROLL ASSEMBLY

Kenneth P. Swanson, 2624 Sea Island Drive, Fort Lauderdale, Fla. 33301

Filed May 6, 1976, Ser. No. 683,735
Int. Cl.² B21B 13/02
U.S. Cl. 29—116 R **14 Claims**

1. An assembly for mounting a textile drafting roll on a shaft for use on a spinning frame and the like, comprising:

a sleeve carrying said roll thereon having;
a bearing race intermediate internally enlarged end portions;
a plurality of circumferentially spaced roller bearings carried within said bearing race each having;



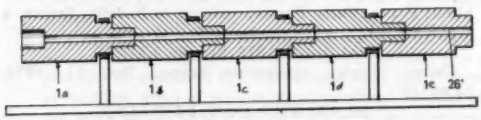
a pair of spaced aligned rollers separated by an enlarged intermediate portion; and
sealing means carried within said enlarged end portions retaining said roller bearings within said bearing race and excluding dirt and lint therefrom.

4,010,528

MULTI-PARTITE GUIDE ROLL

Eberhard Böhmer, Heilshorn, Germany, assignor to Klockner-Werke AG, Duisburg, Germany

Filed Apr. 18, 1975, Ser. No. 569,174
Claims priority, application Germany, May 14, 1974, 2423224; Apr. 27, 1974, 2420514
Int. Cl.² B21B *13/08*
U.S. Cl. 29—125 **3 Claims**



1. A multi-partite guide roll, particularly for use in continuous casting installations, comprising a plurality of axially arrayed discrete roll sections each having two axial ends; a plurality of stems interconnecting the axially adjacent roll sections for enforced joint rotation about a common axis, each of said stems being provided at one of said axial ends of a respective one of said roll sections and received in an axial recess at another axial end of an axially adjacent one of said roll sections; and bearing means in the region of said stems intermediate the axially adjacent ones of said roll sections arranged for mounting said roll for rotation.

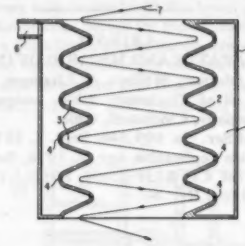
4,010,529

METHOD AND APPARATUS FOR TREATING YARNS

Aldo Honegger, Venissieux, France, assignor to Rhone-Poulenc-Textile, Paris, France

Filed Dec. 22, 1975, Ser. No. 643,482
Claims priority, application France, Dec. 23, 1974, 74.42812
Int. Cl.² D02G *1/00*
U.S. Cl. 28—1.2 **5 Claims**

4. A yarn-treatment unit comprising
a. a body having
b. a yarn passage therethrough, said passage including
c. a spiral yarn path which is defined, at least in part by a spiral groove in said passage,
d. a plurality of apertures directed inwardly toward said spiral yarn path,
e. means for supplying a yarn to said yarn path, and



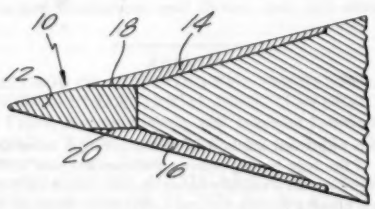
f. means for supplying a treating fluid through said apertures and against the yarn in said yarn path.

4,010,530

METHOD FOR MAKING BLADE PROTECTIVE SHEATHS

Eugene Joseph Delgrosso, Wallingford; Carl Edwin Carlson, East Hartford, and James Augustus Jennings, West Suffield, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed July 24, 1975, Ser. No. 598,891
Int. Cl.² B23P *15/04*
U.S. Cl. 29—156.8 B **6 Claims**



1. A method for protecting the edge of an aerodynamic blade comprising:
providing a metal sheath mid-section element having a top and a bottom surface, said mid-section element being selected from the group consisting of titanium, nickel and alloys thereof;
covering said top and bottom surface with an aluminum bonding material;
laying up a metal top and bottom sheath cover element on each of said top and bottom surfaces of said mid-section element, said top and bottom cover elements being selected from the group consisting of titanium, nickel and alloys thereof and having contact surfaces wider than said top and bottom surfaces of said sheath mid-section element to overhang opposite sides of the same and thereby form channels adapted to receive the edge of said blade;
said aluminum bonding material having a solidus temperature which is lower than the solidus temperature of each of said mid-section element and said top and bottom cover elements;
subjecting the layup to heat and pressure in a die for a time sufficient to bring the temperature of said bonding material to a temperature which is below but within approximately 20° F of its solidus temperature to solid state diffusion bond said mid-section and cover elements together without forming intermetallics, said temperature being 900°–1075° F, said pressure being 1,000–10,000 psi and said time being 2–90 minutes;
severing the bonded product through said top surface, said

mid-section element and said bottom surface to form two U-shaped protective sheaths;

finishing said U-shaped protective sheath to final shape; and

bonding said U-shaped protective sheath to said blade edge.

4,010,531

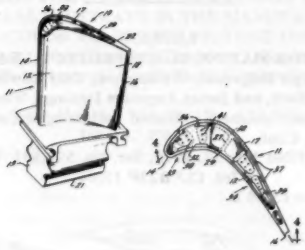
TIP CAP APPARATUS AND METHOD OF INSTALLATION

Richard H. Andersen; William A. Litzinger, and Robert J. Corsmeier, all of Cincinnati, Ohio, assignors to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 609,346, Sept. 2, 1975, Pat. No. 3,982,851. This application Apr. 2, 1976, Ser. No. 672,887

Int. Cl.² B23P *15/04*; F01D *5/18*

U.S. Cl. 29—156.8 H **9 Claims**



1. An improved method of constructing a turbomachinery blade of the type having convex and concave side walls defining a cavity with a radially outer tip end, and a tip cap which forms a closure for the tip end comprising the steps of:

a. forming a blade having convex and concave side walls defining a cavity with an open tip end;

b. providing respective radially spaced platform and retaining means in said cavity on the inner periphery of the side walls, proximate the tip end thereof;

c. providing a closure element in the cavity to interconnect the side walls near the tip end to close a portion thereof;

d. placing a tip cap in contiguity with the radially outer surface of said closure element; and

e. sliding said tip cap to a position wherein it is captured between said platform and said retaining means to close another portion of the tip end.

4,010,532

PORTABLE RIVET BREAKING DEVICE

Albert G. Streeter, P.O. Box 75, Bassett, Ark. 72313

Filed May 21, 1976, Ser. No. 688,910

Int. Cl.² B23P *19/04*

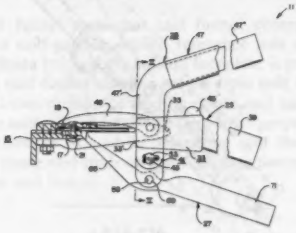
U.S. Cl. 29—267 **6 Claims**

1. A portable rivet breaking device for use with a sickle mower of the type including a base member having a plurality of forwardly projecting guard members fixedly mounted thereon and including a reciprocating drive bar having a plurality of cutting teeth individually riveted thereto, said rivet breaking device comprising:

a. guide means for positioning said rivet breaking device on a sickle mower, said guide means including means for selectively fitting over at least one of the forwardly projecting guard members of the sickle mower;

b. first shear means including a handle member pivotally mounted to said guide means and including a hook member for selectively grasping a portion of an individual cutting tooth of a sickle mower, said hook member being pivotally mounted to said handle member at a location above the location where said handle member is pivotally mounted to said guide means; and

c. second shear means including a strut member for selectively engaging a portion of the reciprocating drive bar of a sickle mower, said strut member being pivotally



mounted to said handle member of said first shear means at a location below the location where said handle member is pivotally mounted to said guide means whereby downward movement of said handle member will cause said hook member to apply a pulling force to the individual cutting tooth which it is grasping and will cause said strut member to apply a pushing force to the portion of the reciprocating drive bar of the sickle mower that it is engaging thereby shearing any rivet holding that individual cutting tooth to the reciprocating drive bar.

4,010,533

METHOD OF PRODUCING A TRANSMISSION DEVICE

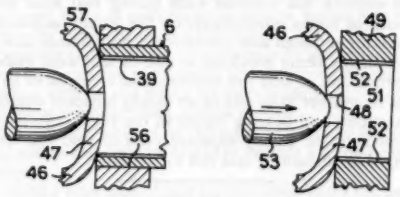
Alfred Pitner, Paris, France, assignor to Nadella, France, a part interest

Filed Dec. 4, 1975, Ser. No. 637,655

Claims priority, application France, Dec. 11, 1974, 74.40740

Int. Cl.² B21D *39/00*; B23P *11/02*

U.S. Cl. 29—523 **14 Claims**

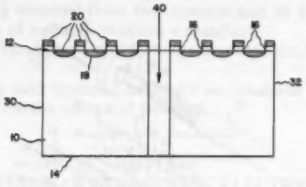


1. A method for producing a transmission device comprising a coupling means, such as a universal joint yoke, having a collar adapted to be connected to a tubular sleeve, comprising producing a blank of the coupling means, forming a centre opening in the blank and forming a collar around the opening from a part of the blank surrounding the opening, cold forming projecting portions on an outer surface of said collar, and connecting the collar to the inside of said tubular sleeve by radially expanding said collar whereby said projecting portions on the outer surface of the collar interengage with projections on the inner surface of said sleeve.

4,010,534
PROCESS FOR MAKING A DEEP DIODE ATOMIC BATTERY

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed June 27, 1975, Ser. No. 590,876
Int. Cl.² B01J *17/00*
U.S. Cl. 29—572 **38 Claims**



1. A process for making a deep diode atomic battery comprising the steps of:

a. selecting a body of single crystal semiconductor material so that the body has a first type conductivity, a selected resistivity, and at least one major surface having a preferred planar crystal structure orientation which is one selected from the group consisting of (100), (110) and (111), the vertical axis of the body being substantially aligned with a first axis of the crystal structure;

b. etching selectively the surface having the preferred planar crystal structure orientation to form at least one array of depressions in the surface;

c. vapor depositing a layer of a metal in the depressions of the at least one array on the selected surface of the body of semiconductor material;

d. heating the body and the metal to a temperature sufficient to form a melt of metal-rich material in each of the depressions on the surface of the body;

e. establishing a temperature gradient along substantially the vertical axis of the body and the first axis of the crystal structure;

f. migrating the metal-rich melt through the body along the first axis of the crystal structure to divide the body into a plurality of regions of first type conductivity and to form at least one array of regions of recrystallized material of the body having solid solubility of the vapor deposited metal therein, the metal including at least one dopant impurity material therein to impart a second and opposite type conductivity and a selected level of resistivity thereto;

g. providing a means for disposing a source of radioactive material within the body in a predetermined relationship with the material of the body and the material of regions of the at least one array;

g. electrically connecting the plurality of first type regions into a first internal electrical circuit arrangement, and

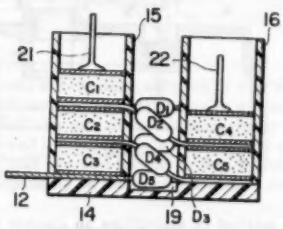
i. electrically connecting the plurality of second type regions into a second internal electrical circuit arrangement.

4,010,535
METHOD OF FABRICATING A VOLTAGE MULTIPLIER CIRCUIT ASSEMBLY

Hideo Hishiki; Shiyousaku Yamaguchi, and Akihisa Miyazaki, all of Yokohama, Japan, assignors to Victor Company of Japan, Limited, Japan

Filed Oct. 29, 1974, Ser. No. 519,052
Claims priority, application Japan, Oct. 31, 1973, 48-122605; Dec. 25, 1973, 48-147254[U]
Int. Cl.² H05K *13/00*
U.S. Cl. 29—577 **11 Claims**

1. The method of fabricating a voltage multiplier assembly, comprising: stacking condensers, each comprised of a pair of opposed plate electrodes with a dielectric sandwiched therebetween, alternately on a first and second area with one of the electrodes facing downward so that the upper plate electrode of each condenser is in contact with the lower plate electrode of an adjacent condenser except for the uppermost condenser; placing one of a plurality of diodes having connecting leads to the opposite end thereof alternately with the stacking of each condenser on alternate third and fourth areas between said first and second areas with their connecting leads extending

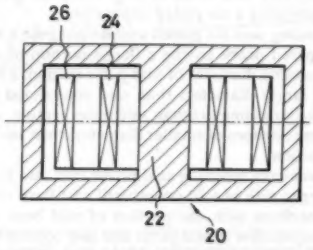


into said first and second areas such that the diodes are connected in a series circuit with each other with their respective leads between the electrodes of pairs of said stacked condensers and having relative polarities to define a direction of current flow; and applying conductive cementing agent to contact points between contacting electrodes of said stacked condensers and corresponding ones of the connecting leads of said diodes between said stacked condensers, thereby to form an integral voltage multiplier assembly consisting essentially of said stacked condensers, said diodes, and said cementing agent.

4,010,536
METHOD OF ADJUSTING TWO CONCENTRIC WINDINGS IN ELECTRICAL INDUCTION DEVICES

Toshio Fujita; Katusada Ishida, and Takehiko Funakoshi, c/o Kabushiki Kaisha Meidensha, No. 2-1-17, Ohsaki, Shinagawa, Tokyo, Japan

Continuation of Ser. No. 457,721, April 3, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 625,158
Claims priority, application Japan, Apr. 4, 1973, 48-38966; Apr. 7, 1973, 48-40129
Int. Cl.² H01F *41/00*
U.S. Cl. 29—593 **7 Claims**

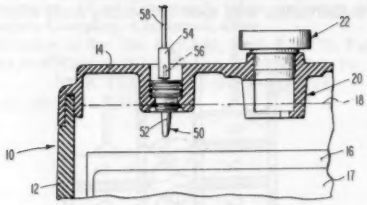


1. A method of making coincident the electro-magnetic centers of two cylindrical power windings disposed coaxially with a limb of an iron core of an electric induction machine and with each other, the method comprising the steps of: a) exciting one of said windings to put the other winding in electromagnetically coupled relationship to said one winding, thereby causing said other winding to produce a magnetic leakage flux having opposed radial components with opposite signs; and b) moving a given one of said windings axially relative to the remaining one of said windings to a position where the quantities of the opposed radial components of the leakage flux are equal except for their signs; while c) detecting the difference between the quantities of the opposed radial components of the leakage flux.

4,010,537
EPOXY SEALED LEAD BATTERY PROBE AND METHOD FOR INSERTING SAME

Terry Russel Oxenreider, Wernersville, Pa., assignor to General Battery Corporation, Reading, Pa.

Filed July 3, 1975, Ser. No. 593,000
Int. Cl.² H01M *10/48*
U.S. Cl. 29—623.2 2 Claims



1. In a method of assembling an electric storage battery comprising the steps of:
   a. molding a complementally configured case and cover;
   b. introducing stacks of battery plates and separators into said case;
   c. forming the desired intercell connections between said stacks;
   d. applying epoxy resin to the portions of the undersurface of said cover which will engage said case, and placing said cover on a supporting surface so that said undersurface forms the upper surface thereof;
   e. inverting and placing said case on said cover; and
   f. allowing said epoxy to cure, thereby sealing said case to said cover;

The improved method:

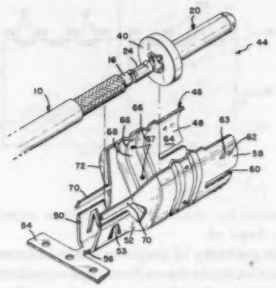
   i. wherein step (a) further comprises the step of molding said cover to have a substantially annular boss therein, said boss having a bore defined therethrough being formed having a substantially cylindrical outer section contiguous to the upper surface of said cover, a constricted section of lesser diameter than said outer section, and a beveled section tapering outwardly towards the undersurface of said cover;
   ii. wherein an additional series of steps are performed prior to step (d), said series of steps comprising the steps of:
      A. providing a tin plated copper pin;
      B. casting said tin plated copper pin into a substantially tapered probe having a flange portion of substantially the same diameter of said outer section, a head portion of larger diameters than said constricted portion and smaller diameters than said outer section, and mid and base portions of smaller diameters than said constricted portion;
      C. manually inserting said probe into said bore from the upper side of said cover until cast flash on said probe interferes with the portion of said boss defining the intersection of said outer and said constricted portions, whereby a seal is formed between said flange portion of said probe and said outer section of said bore; and
   iii. wherein step (d) further comprises the steps of:
      A. applying epoxy resin between said base portion and said beveled portion, whereby said beveled portion acts as a reservoir for said epoxy resin; and
      B. allowing said resin to flow from said reservoir between said mid and head portions of said probe and the portions of said constricted and outer sections adjacent thereto until retained by said seal whereby an hourglass-like seal is formed between said probe and said bore;

thereby forming a battery having a probe sealed therein to sense the preferred level of electrolyte in said battery.

4,010,538
PHONO PLUG

Michael Francis O'Keefe, Mechanicsburg; Dennis Penrose Schwenk, Hummelstown; Ronald Clair Laudig, Mechanicsburg, and Suel Grant Shannon, Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 592,160, July 1, 1975, abandoned. This application Apr. 26, 1976, Ser. No. 680,612
Int. Cl.² H01R *9/00*
U.S. Cl. 29—630 A 2 Claims

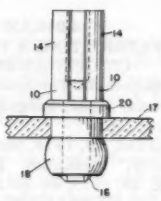


1. A method of asembling a phono plug comprising the steps of:
   a. stripping a length of coaxial cable to expose the center conductor and the braided shield;
   b. providing a center contact member having a pin at one end and a wire barrel at another end and crimping the wire barrel around the exposed length of the center conductor;
   c. slipping an annular insulating disc around the pin on the center contact member;
   d. providing a shell member having an open housing portion at the forward end with a pair of fingers projecting rearwardly therefrom, and an open wire barrel at the rearward end and placing the disc carrying center contact member into the open housing portion so that the exposed braided shield lies in the open wire barrel;
   e. forming the open housing portion into a closed cylinder around the insulating disc with the fingers on the housing being placed into the open wire barrel; and
   f. crimping the wire barrel on the shell member into encompassing relation about the fingers and the braided shield lying therein.

4,010,539
METHOD FOR FABRICATING MULTI-FURCATED ELECTRICAL TERMINALS

James Iantorno, Mamaroneck, N.Y., assignor to Sealectro Corporation, Mamaroneck, N.Y.

Filed Mar. 8, 1976, Ser. No. 664,988
Int. Cl.² H01R *9/00*
U.S. Cl. 29—630 D 1 Claim



1. A method for producing an electrical terminal having a

series of parallel extending metal tines integral with an insulated bushing comprising the steps of:

extruding a length of metal having a generally circular cross section to form spaced channels in the extruded surface;

fastening the extruded length of metal in a collet in a screw machine;

removing by drilling a portion of the central core to create a plurality of spaced tines on one end of the extruded length of metal, said tines being capable of supporting an external connecting conductor;

removing the extruded length of metal from the collet;

removing material from the opposite end of the extruded length of metal to produce a spindle;

cutting the opposite end from the extruded length of metal; and

inserting said opposite end into an insulated bushing to complete the electrical terminal.

4,010,540

METHOD OF CONNECTING ELECTRICAL CONDUCTORS AND CONNECTIONS OBTAINED THEREBY

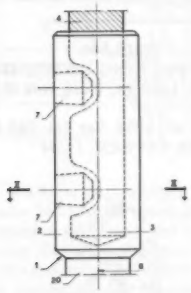
Andre Savigny, Eaubonne, France, assignor to Societe de Vente de l'Aluminium Pechiney, Paris, France

Filed June 30, 1975, Ser. No. 591,869

Claims priority, application France, July 25, 1974, 74.25823

Int. Cl.² H01R 9/14

U.S. Cl. 29—630 A **3 Claims**



1. A method of connecting electrical conductors by means of a connection comprising a sleeve, including the steps of; engaging the extremity of a conductor into the sleeve, orientating at least one punch perpendicular to the axis of the sleeve at any point about the exterior thereof, retaining the punch in contact with the exterior of the sleeve at the chosen point about the exterior thereof, and driving the punch perpendicularly through the exterior of the sleeve to effect an inward deformation of the aligned area of the sleeve, a permanent seating of the punch within the sleeve, and a corresponding flattening of the conductor.

4,010,541

CITRUS FRUIT PEELING IMPLEMENT

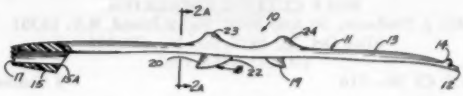
Jean Guy Papineau, 2306 Charles Road, Hallandale, Fla. 33009

Filed Jan. 15, 1976, Ser. No. 649,243

Int. Cl.² A47J 17/04

U.S. Cl. 30—123.7 **3 Claims**

1. A citrus fruit peeling implement comprising, in combination, an elongated body member, cutting means extending outwardly of one side of said body member intermediate the ends thereof for scoring, about its periphery, the rind of a citrus fruit to be peeled, said cutting means comprising a cutting edge directed to an end portion of said body member, said cutting edge terminating in a blunt tip to minimize the possibility of cutting into the fruit meat of the citrus fruit being scored, one end of said body member being substantially flat, and being terminally rounded to facilitate its wedge-like insertion beneath the rind at a scored cut for prying the rind from the fruit, and a second cutting means substantially identical with said first mentioned cutting means, spaced from said first



cutting means and intermediate the ends of said body member, said second cutting means extending to a lesser distance outwardly of said one side of said body member and being directed to the end thereof opposite the direction of said first cutting means, said first and second cutting means being for selective use depending on the thickness of the citrus rind to be scored.

4,010,542

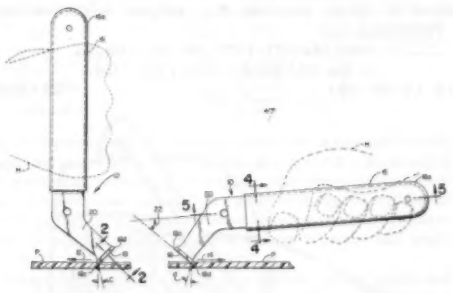
PLASTIC SCORING TOOL

Philip E. Richardson, West Hartford, and Lothar Lenhardt, Manchester, both of Conn., assignors to The Fletcher-Terry Company, Farmington, Conn.

Filed June 27, 1975, Ser. No. 591,173

Int. Cl.² B26B 3/00

U.S. Cl. 30—164.9 **2 Claims**



1. A tool for scoring plastic sheet material by hand, said tool having a flat handle with a longitudinal axis adapted to be held at a small angle to the sheet surface to be scored and also adapted to be held generally normal to the surface of the sheet to be scored, a flat blade having a straight chisel edge with two alternately usable scoring tips defined at opposite ends of said chisel edge, said edge being V-shaped and defined by ground surfaces **18***a* and **18***b*, said V-shaped chisel edge oriented at an angle of approximately 45° with respect to said handle axis and being offset with respect thereto, said blade and handle integrally connected to one another by an intermediate flat shank portion providing said offset such that said alternately useable tips have a castering action when the handle is so held, said handle, said blade and said intermediate shank portion being coplanar, and both tips defined in part by said ground

surfaces 18*a* and 18*b* and also defined in part by ground end faces 18*c* and 18*d* at opposite ends of said chisel edge, each of said ground end faces oriented at an angle such that a 15° forward rake angle (c or d) with respect to a normal reference line drawn to said sheet surface is provided for the tips when the handle is so held to score plastic sheet material.

4,010,543

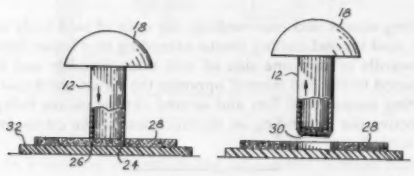
HOLE CUTTING APPARATUS

Max J. Nusbaum, 30 Arlo Road, Staten Island, N.Y. 10301

Filed Oct. 28, 1975, Ser. No. 626,311

Int. Cl.² B26B *3/00*

U.S. Cl. 30—316 **9 Claims**



1. A hole cutting apparatus comprising, a hollow tube having a top and bottom end, said bottom end being chamfered on the outer surface completely around the circumference thereof and being cut at a shallow angle with respect to a plane transverse to the longitudinal axis of the tube to form a cutting edge, said cut of said bottom end being less than the angle of the chamfer, whereby one portion of the bottom end has a greater chamfer than the rest of the bottom end, and a knob coupled to the top end of the tube to form a handle.

4,010,544

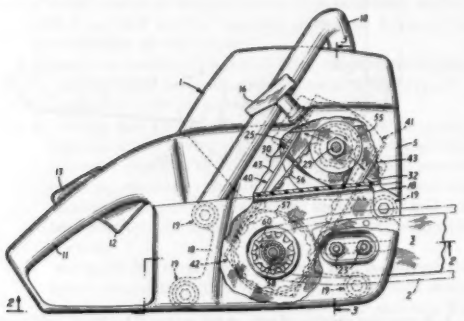
VIBRATION REDUCING SYSTEM FOR SINGLE CYLINDER FLUID PRESSURE ENGINE

Alfred W. Siman, Rivervale, N.J., assignor to Textron, Inc., Providence, R.I.

Filed Mar. 21, 1975, Ser. No. 560,702

Int. Cl.² B27B *17/02*; **F16F** *1/18*

U.S. Cl. 30—381 **23 Claims**



1. A vibration reducing system for a fluid pressure engine having a cylinder, a crankcase, a piston reciprocable in said cylinder, a rotary drive shaft in said crankcase and means connecting said drive shaft and piston for coordinated rotation of said drive shaft and reciprocation of said piston, said system comprising, in combination with said engine, means for rotationally balancing said drive shaft and any parts that revolve with it, a support for said engine, means for mounting said engine on said support for movement relative to said support only in a direction approximately axial of said cylinder, said mounting means comprising parallelogram linkage means connected at one end to said engine and at the other end to said support, and means acting between said support and said engine to bias said engine to a position in which said linkage means is approximately normal to the axis of said cylinder, a second shaft rotatably mounted on said support laterally spaced from and parallel to said drive shaft with the axes of said shafts lying in a common plane approximately normal to the axis of said cylinder, and means rotationally connecting said second shaft with said drive shaft, said mounting means maintaining the distance between said shafts substantially constant.

4,010,545

ADHESIVE BONDING TO TEETH OF ORTHODONTIC BRACKETS AND THE LIKE

Robert J. Kilian, East Amwell Township, Hunterdon County, and John S. Gallagher, North Brunswick, both of N.J., assignors to Johnson & Johnson, New Brunswick, N.J.

Filed Jan. 9, 1976, Ser. No. 647,845

Int. Cl.² A61C *7/00*

U.S. Cl. 32—14 A **8 Claims**

1. The method of adhering an attachment to a tooth surface comprising

etching said tooth surface in the area to which said attachment is to be secured,

placing said attachment on said etched tooth surface with a small amount of highly viscous thixotropic polyacrylic ester monomer composition between said attachment and said tooth surface, pressing said attachment against said tooth with said thixotropic monomer therebetween to wet the opposing surfaces of said tooth and attachment with said monomer and fill surface voids therebetween and curing said thixotropic monomer composition while said attachment is held on said tooth surface thereby.

4,010,546

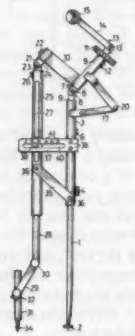
ELLIPSE DRAWING INSTRUMENT

Pi Ching-Tien, No. 34, Lane 98, T'ung Hua St., Taipei, China /Taiwan

Filed Oct. 10, 1974, Ser. No. 505,439

Int. Cl.² B43L *11/04*

U.S. Cl. 33—30 R **3 Claims**



1. An ellipse drawing compass comprising:

a first axle with a point adapted to contact

a drawing surface,

a first sleeve slidably mounted about said first axle, means to releasably secure said first axle

to said first sleeve,

a second axle rotatably mounted in said first sleeve about said first axle,

a third axle with means to adjustably mount same to said second axle at an incline,

a second sleeve rotatably mounted about said third axle,

means connecting said first sleeve to said second sleeve to synchronize the rotation of said sleeves about said axles comprising two arms pivotally connected to said sleeves and to each other,

a drawing leg comprising an implement holder slidably mounted in a third sleeve,

said third sleeve having a longitudinal slot and said holder having a pin which slides in said slot,

a first connecting member with means pivotably connecting same to said first sleeve and said third sleeve,

a second connecting member with first means rigidly connecting same to said first sleeve and further having a longitudinal slot normally disposed in the horizontal plane said slot further receiving said pin for sliding movement,

and a third connecting member with first means to rigidly connect same to said second sleeve and second means to pivotally connect same to said third sleeve.

4,010,547

DRAFTING MACHINE

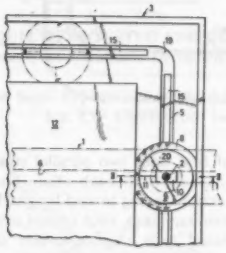
Michael Kaltatzidis, 34 Weiherstrasse, D-7775 Bermatingen, Germany

Filed Dec. 23, 1974, Ser. No. 536,021

Claims priority, application Germany, May 14, 1974, 2423306

Int. Cl.² B43L *13/04*

U.S. Cl. 33—80 **13 Claims**



1. A drafting machine, comprising a rectangular drafting frame, a continuous and uninterrupted guide groove provided on a drawing surface of said frame and having portions parallel to each side edge thereof, said groove having smooth outer and inner side walls and making a smooth transition at corners of said frame by having smooth rounded corners thereat, a pair of spaced apart slide elements disposed in said groove, bridge means interconnecting said slide elements, at least one drawing instrument being connected to said bridge means, and said slide elements each having a rounded surface facing inwardly of said frame, whereby said instrument may be displaced longitudinally of said guide groove in a rectilinear movement along said portions thereof, and whereby said instrument pivots about a central axis of said bridge means located between said slide elements upon movement of said instrument along said rounded corners.

4,010,548

SHOCK-ABSORBING MECHANISM FOR DIAL GAGE

Shozo Iwasaki, Ebina, Japan, assignor to Kabushiki Kaisha Akashi Seisakusho, Japan

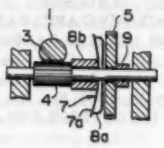
Filed Mar. 3, 1976, Ser. No. 663,296

Claims priority, application Japan, Mar. 24, 1975, 50-35085

Int. Cl.² G01D *5/02*

U.S. Cl. 33—172 R **1 Claim**

1. A shock-absorbing mechanism for use in a dial gage having a pinion shaft rotated by a spindle that moves along a straight line and a magnifying gear coaxially and idlingly meshed with the pinion shaft so as to rotate a pointer shaft gear, which comprises a star-shaped pressure spring with radiately extending, elastic branches having not only elasticity in the axial direction of said pinion shaft but also high rigidity in the rotating direction thereof, and a dished spring bearing to deform said pressure spring so as to provide said axial elasticity, said star-shaped pressure spring and dished spring



bearing being disposed coaxially with said magnifying gear and a stopper ring fixed on said pinion shaft so that the magnifying gear is pressed against the stopper ring in a frictionally contacted manner.

4,010,549

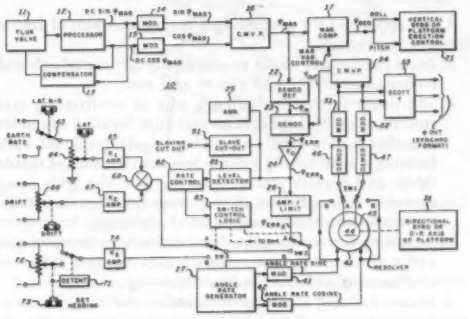
ALL SOLID STATE ANALOG GYROMAGNETIC COMPASS SYSTEM

David R. Crocker, and George W. Snyder, both of Phoenix, Ariz., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Oct. 29, 1975, Ser. No. 626,898

Int. Cl.² G01C *17/38*

U.S. Cl. 33—317 D **12 Claims**



1. In a gyromagnetic compass system for a navigable craft, angle rate generator apparatus responsive to a d.c. error signal for producing therefrom an angular rate signal proportional thereto having sine and cosine component signals and useful for electronically slaving and compensating the inertial directional reference of said compass system wherein said angle rate generator apparatus comprises:

integrator means for integrating said d.c. error signal and generating at the output thereof said sine component signal having a frequency and phase which vary as a function of the amplitude and polarity respectively of said d.c. error signal and wherein said sine component signal in response to a d.c. error signal of zero amplitude maintains a constant amplitude;

first polarity control means for alternating the polarity of the d.c. error signal coupled to said integrator means;

second polarity control means coupled to the output of said integrator means for varying the polarity of the slope of said sine component signal;

amplitude reference source means for producing a d.c. reference signal having a fixed amplitude;

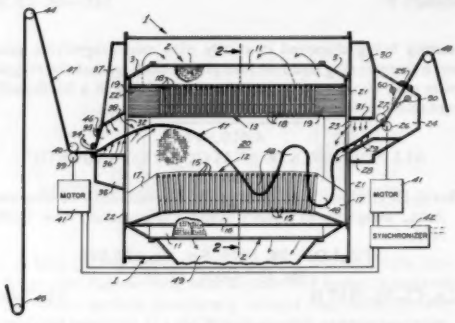
third polarity control means for alternating the polarity of said reference signal;

summing means for summing said reference signal and said sine component signal as varied by said second polarity control means and producing therefrom said cosine component signal; and

quadrant control means responsive to said sine and cosine component signals for actuating said first, second and third polarity control means such that a sine/cosine rela-

tionship is maintained between the amplitudes of said sine and cosine component signals.

4,010,550
CONTINUOUS PROCESSING APPARATUS AND METHOD FOR TEXTILE FABRICS
Benjamin H. Freze, Anaheim, Calif., assignor to Challenge-Cook Bros., Incorporated, Industry, Calif.
Filed July 28, 1975, Ser. No. 599,625
Int. Cl.² F26B *3/04*
U.S. Cl. 34—23 **16 Claims**



1. An apparatus for processing a continuous web of textile fabric, comprising:

a. drum oscillatable about an essentially horizontal axis and having an entrance end and an exit end;

b. the drum further including a pair of confronting grid structures extending between said ends forming a tumbler chamber having axially extending angularly related walls forming a zone having a depth less than the web of textile fabric and a width greater than the web, the grids being movable on oscillation of the drum between essentially vertically and horizontally related positions;

c. a housing surrounding the drum and having entrance and exit walls covering the entrance and exit ends of the drum and forming entrance and exit openings;

d. means defining an entrance chamber including the housing entrance wall and communicating through the entrance opening with the interior of the drum;

e. means defining an exit chamber including the housing exit wall and communicating through the exit opening with the interior of the drum;

f. an entrance drive means positioned to feed a continuous web of textile fabric through the entrance chamber into the drum;

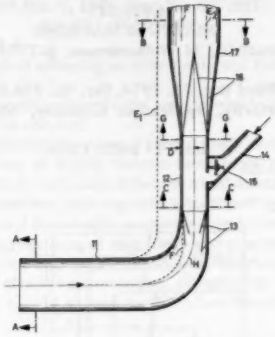
g. an exit drive means positioned to withdraw the web from the drum through the exit chamber;

h. and means for sychronizing the entrance movement and exit movement of the web to maintain within the drum a length of web in excess of the length of the drum;

i. said drum, upon oscillation, causing limited twisting and lateral displacement of the web in opposite directions as the web moves between the entrance and exit ends of the drum.

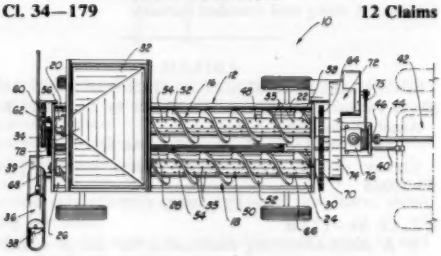
4,010,551
ARRANGEMENT FOR THE TREATMENT, PARTICULARLY THE DRYING, OF PARTICULATE MATTER BY ENTRAINMENT IN A GAS
Wolfgang Rohde, Essen, Germany, assignor to Bergwerksverband GmbH, Essen, Germany
Filed June 10, 1975, Ser. No. 585,583
Claims priority, application Germany, June 10, 1974, 2427932
Int. Cl.² F26B *17/00*
U.S. Cl. 34—57 R **7 Claims**

1. A pneumatic conveying dryer, comprising a drying zone having an inlet region for the introduction of a stream of particulate matter which is entrained by a gas; means upstream of said inlet region defining a flow path for the substantially uniform entrainment of particulate matter by a gas, said means including a first section having at least one arcuate part and which is arranged for communication with a source of gas, and said first section comprising an upstream portion of substantially circular cross-section and a downstream end of substantially rectangular cross-section and having a region wherein the flow path cross-section decreases in downstream direction, said means further including a second section of substantially rectangular transverse cross-section communicating with said downstream portion, said second section having a pair of first sides and a pair of second shorter sides, said second section having in a longitudinal cross-section



across said pair of first sides two parallel straight boundary lines spaced transversely from each other, and said arcuate part of said first section having in said longitudinal cross-section two curved boundary lines, each of said straight boundary lines being tangential to a respective one of said curved boundary lines, and said means also including a third section arranged intermediate said second section and said inlet region and communicating therewith, said third section comprising an upstream end of substantially rectangular cross-section and a downstream part of substantially circular cross-section and having a region wherein the flow path cross-section increases in downstream direction; and an admitting arrangement communicating with one of said first sides of said second section for introducing into said second section particulate matter to be entrained by a gas flowing from said first section towards said inlet region.

4,010,552
GRAIN DRIER
Emery J. Peterson, Clifton, Kans. 66937
Filed Mar. 17, 1976, Ser. No. 667,489
Int. Cl.² F26B *11/12*
U.S. Cl. 34—179 **12 Claims**



1. A grain drier for drying grain, the drier comprising:

an elongated drier housing;

a first elongated horizontal cylindrical chamber formed in said housing, said first chamber having a first end portion and a second end portion;

a second elongated horizontal cylindrical chamber formed in said housing, said second chamber having a first end portion and a second end portion, said second chamber adjacently disposed below and parallel to said first chamber, the first end portion of said second chamber communicating through an opening with the second end portion of said first chamber;

a first auger having a hollow shaft with perforations therein, said first auger horizontally mounted in said first chamber;

a second auger having a hollow shaft with perforations therein, said second auger horizontally mounted in said second chamber;

drive means attached to said first and second auger for rotating said augers in said chambers; and

blower means communicating with the hollow shafts of said augers for blowing hot air into said hollow shafts and out the perforations therein for drying said grain,

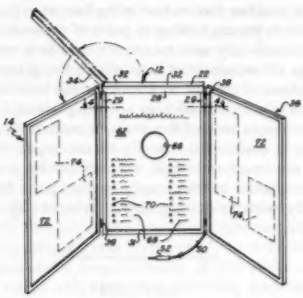
the grain to be dried is received at the first end portion of said first chamber and conveyed by said first auger to the second end portion of said first chamber, said first auger feeding the grain from the second end portion of said first chamber into the first end portion of said second chamber, said second auger conveying the grain from the first end portion of said second chamber to the second end portion of said second chamber and discharging the grain from said housing.

4,010,553

PORTABLE QUIZ RESPONSIVE AND DISPLAY DEVICE

Robert A. Bennett, 312 Ronbru Drive, New Rochelle, N.Y. 10804

Filed Sept. 19, 1975, Ser. No. 614,922
Int. Cl.² G09B 7/06
U.S. Cl. 35—9 C **2 Claims**



1. An electrically operated self-examination device comprising

A. an electrical circuit including a metal electrical conducting panel, a battery mounted on one side of said panel and electrically connected thereto, an electrical responsive lamp connected to one pole of said battery, and a probing lead connected to the other pole of said battery whereby contact of said probing lead with said panel closes the circuit and activates said lamp.

B. a non-conducting plastic sheet laminated to the other side of said panel and having a plurality of apertures through which said circuit may be closed by contacting said probing lead to said panel.

C. a question card adapted to be in flat registry against said non-conducting sheet, said card having printed questions on the surface opposed to said sheet, each question having multiple choice answers and an opening associated with each answer, said answer card openings having been positioned so that correct answer openings register with plastic sheet apertures whereby said lamp will be lit when said probe is placed through a correct answer aperture, and

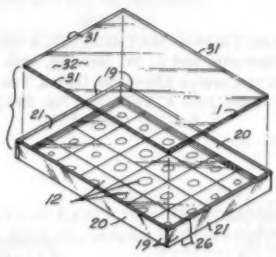
D. a case sized to hold in snug registry said conducting panel and said card lying against said non-conducting sheet with said card facing a front opening side of said case, said conducting panel being spaced from the rear wall of said case a sufficient distance to clear said battery and indicator and further provide space for storage of a plurality of said answer cards, said case being provided with a pivotal wing panel on each side of said front opening that overlap on closing to form a front wall to said case and provide two display panels when open, said card and said conducting panel having an opening in alignment with said lamp for observation thereof from the front of said case, and said rear wall having a pivotal support member to hold said case in standing position.

4,010,554

ANATOMICAL DISPLAY DEVICE AND PROCESS FOR PREPARING AND DISPLAYING ANATOMICAL ORGAN SPECIMENS

Robert W. Compton, 635 E. State Ave., Meridian, Idaho 83642

Filed Feb. 13, 1976, Ser. No. 657,843
Int. Cl.² G09B 23/30
U.S. Cl. 35—20 **15 Claims**



1. A process for preparing and mounting macroscopic sliced anatomical organ specimens comprising the steps of:

a. suspending an anatomical organ within transparent solidifying medium such as agar solution;

b. slicing the suspended organ and surrounding medium into sections of equal thicknesses;

c. pouring a liquid preservative into an upwardly open transparent container;

d. arranging the sliced sections in a prescribed array in the liquid preservative;

e. pressing a transparent cover plate over the sections in the container to remove all air from between the cover plate and container; and

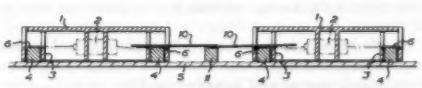
f. affixing the transparent cover plate to the container to hermetically seal the sections and liquid preservative within the container under the transparent plate.

4,010,555

APPARATUS FOR DEMONSTRATING ELECTRICAL CIRCUITS AND COMPONENTS

Bo Gunnar Paulsson, Nynasgatan 7, 252 52 Helsingborg, Sweden

Filed May 23, 1973, Ser. No. 363,000
Claims priority, application Sweden, May 31, 1972, 7127/72; Sept. 13, 1972, 73069/72
Int. Cl.² G09B 23/18
U.S. Cl. 35—19 A **11 Claims**



1. In an apparatus for demonstrating electrical circuit

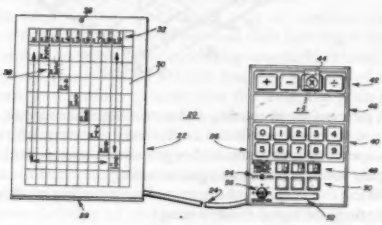
means and electrical circuit component means, base means including magnetic material, support means for accommodating said circuit means and for mounting on said base means, contact means for electrical connection with said circuit means in each of said support means, each of said contact means being mounted on said support means above said magnetic material and extending in a plane parallel to and spaced a distance from the plane common to said support means and said base means, conductor means for extension between said contact means of said support means and for electrical coupling of them with each other and said conductor means including magnetic material and extending in the same plane as said contact means, said support means being provided with magnetic means for retaining said support means and said conductor means to said base means and holding said conductor means and said contact means together.

4,010,556

ELECTRONIC MATHEMATICS TRAINER

Carolyn Ellsworth, and L. W. Herring, both of Dallas, Tex., assignors to Carolyn Ellsworth, Dallas, Tex.

Filed June 4, 1975, Ser. No. 583,850
Int. Cl.² G09B *23/02*
U.S. Cl. 35—30 **64 Claims**



1. An electronic mathematics trainer comprising:
means for selectively entering an arithmetic problem to be solved,
means for computing the correct answer to the arithmetic problem,
means for generating at least one incorrect answer to the arithmetic problem,
means for displaying the correct and incorrect answers,
means for randomly positioning the correct and incorrect answers on said display means,
means operable for selecting one of the displayed answers, and
means for clearing the entered arithmetic problem upon the selection of the correct displayed answer.

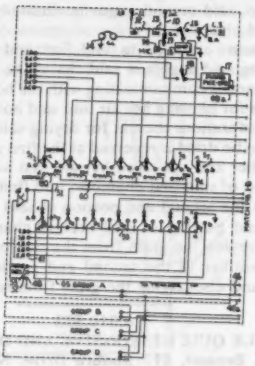
40. A method of teaching arithmetic skills, comprising the steps of:
displaying a plurality of arithmetic problems to be solved,
entering the decimal numbers and the arithmetic operation mode of one of the arithmetic problems into an electronic mathematics trainer,
displaying the entered arithmetic problem without an answer to the student,
computing a correct answer and at least one incorrect answer,
randomly displaying the correct answer and at least one incorrect answer,
selecting one of said answers, and
displaying the correct answer together with the entered problem upon the selection of a correct answer.

4,010,557

MUSIC LABORATORY

Daniel W. Martin, and Robert G. Morgan, both of Cincinnati, Ohio, assignors to D. H. Baldwin Company, Cincinnati, Ohio

Division of Ser. No. 719,126, April 5, 1968, Pat. No. 3,595,120. This application Apr. 27, 1971, Ser. No. 138,004
Int. Cl.² G09B *19/04*
U.S. Cl. 35—35 C **8 Claims**



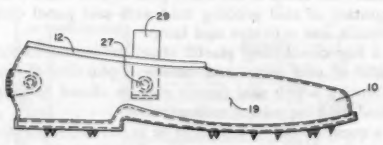
1. A system of intercommunication among (1) groups of members of a class or individual members of said class or the entire class with (2) a teacher station, comprising a group amplifier, a teacher station incoming line, an *n* position rotary contact switch means having *m* pairs of decks wherein *n* is a number of stationary switch contacts and *m* is one more than the number of members of one group, the groups all having equal numbers of members, wherein each individual member of said class is provided with an outgoing line and an incoming line, and wherein one of the rotary contacts of said pairs of said decks is connected directly to the input of said group amplifier the another to said teacher station incoming line, and the remainder of said rotary contact pairs are connected individually with said outgoing and incoming lines of the members.

4,010,558

GOLF RUBBER OVERSHOE

John G. Slusher, Jackson Heights, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Nov. 10, 1975, Ser. No. 630,421
Int. Cl.² A43B *1/10, 5/00, 21/00*
U.S. Cl. 36—7.3 **1 Claim**



1. An overshoe of flexible rubber or plastic material for fitting about a spiked golf shoe, said overshoe shaped to fit over a golf shoe, with the sole and heel portion of the overshoe shaped with an open section to provide clearance for the spikes on the sole and heel of the golf shoe,
said open section bounded by a border strip that is continuous save for a slot in the rear of the heel section, which slot marks the separation of two rear sections forming the rear side of the overshoe.

said two rear sections joined in overlapping fashion along the rear vertical sides of the overshoe by a first detachable strap,

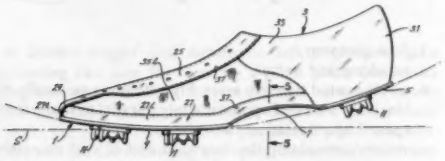
together with a second strap mounted to extend over the top of the overshoe which is detachably fastened to each opposed side of the overshoe at the instep section of the overshoe.

4,010,559

ATHLETIC SHOE

Hal D. Mitchell, Shrewsbury, Mo., assignor to A-T-O Inc., Willoughby, Ohio

Filed May 17, 1976, Ser. No. 687,192
Int. Cl.² A43B 5/02
U.S. Cl. 36—128 **9 Claims**



1. An athletic shoe comprising a sole and an upper, the sole having a heel section for the bottom of the heel of the foot, an arch section forward of the heel section for the bottom of the arch of the foot, and a front section forward of the arch section for the portion of the bottom of the foot forward of the arch and for the toes, the arch section and the heel section being so formed and positioned that, with the front section disposed on a generally flat horizontal surface, and the sole unstressed, the arch section extends upwardly and rearwardly from the rear end of the front section with its rear end raised above said surface, and the heel section extends upwardly and rearwardly from the rear end of the arch section, the heel section being raised above said surface and being inclined upwardly and rearwardly in the direction away from the rear end of the arch section relative to said surface and to the front section, the heel and front sections having cleats on the bottom thereof, the heel section and the front section being relatively stiff, the arch section being relatively flexible and resilient with respect to the heel and front sections, the arch section being adapted relatively readily to twist about an axis extending generally longitudinally of the shoe and to bend upon itself on an axis extending generally transversely of the shoe whereby, on a lateral blow upon the knee when the cleats on the heel and front sections are in the turf of a playing field, the heel section may readily flex upwardly via flexing of the arch section for withdrawal of the cleats on the heel from the turf to tend to avoid injury to the knee.

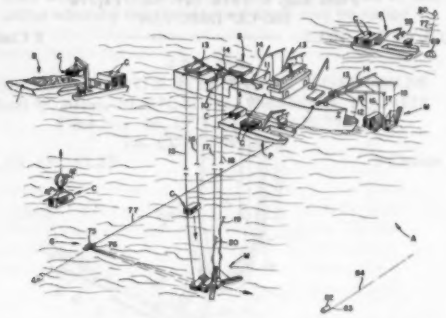
4,010,560

DEEP SEA MINING APPARATUS AND METHOD

Richard E. Diggs, 12 A Road, Carthage, Mo. 64836

Filed May 14, 1975, Ser. No. 577,343
Int. Cl.² E02F 7/00
U.S. Cl. 37—54 **16 Claims**

1. A deep sea mining apparatus for mining mineral nodules on the ocean floor, comprising at least one support ship floating in a body of water, at last one self-propelled nodule mining machine supported from the support ship and resting on the floor of the body of water for movement along the floor, control means connected with the support ship and with the machine for controlling operation of the machine, nodule gathering means carried by the machine for gathering nodules from the ocean floor, nodule collecting crate means carried by the machine for collecting and holding the nodules gathered by the nodule gathering means, said crate means separable from said machine, and lift means connected to the crate means and comprising an inflatable bag carried by the crate means, and means carried by the crate means for inflating the



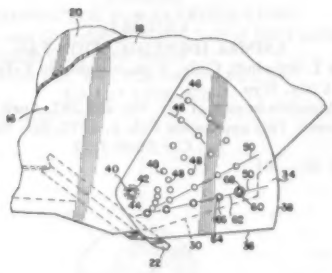
inflatable bag for lifting the crate means to the surface of the body of water when the crate means is filled with said nodules whereby said nodules may be recovered.

4,010,561

EARTH SCRAPER WITH ROUTER BIT

Gene R. Klett, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 21, 1975, Ser. No. 569,915
Int. Cl.² E02F 9/00; A01B 23/02
U.S. Cl. 37—141 T **4 Claims**

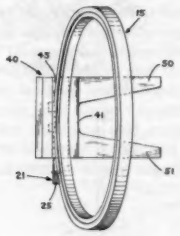


1. In an earthmoving scraper having a bowl with a pair of spaced apart walls, a cutter blade extending between said walls and projecting forwardly for cutting a layer of soil, a router bit carried by one of said walls and having a cutting edge for fracturing the soil adjacent said cutter blade, means for pivotally mounting one end portion of said router bit on said wall, means for securing said router bit to said wall, means for repositioning said router bit to advance said cutting edge to accommodate for wear, said means for repositioning said router bit comprising a plurality of apertures through said bit with at least two of said apertures lying in a straight line offset from said means for pivotally mounting said bit and the wall of said bowl having at least two openings lying in a straight line which line is offset from the pivotal mounting of the bit an amount equal to the offset of the line of apertures, said aligned apertures aligning with said aligned openings and said means for securing said bit to said wall comprising fastening means passing through said apertures and said openings.

4,010,562
EMBROIDERY HOOP HOLDER

Henry K. Maier, 31 Morris Road, West Orange, N.J. 07052

Filed Aug. 5, 1976, Ser. No. 711,776
Int. Cl.² D05C 1/04
U.S. Cl. 38—102.2 8 Claims

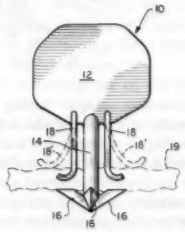


1. An embroidery hoop holder for use with an embroidery hoop having an inner hoop and an expandable outer hoop, and means for adjusting said outer hoop in order to position between said inner and outer hoops a cloth to be embroidered, comprising: a main portion having a groove formed therein for receiving a portion of said outer and inner hoops and said means for adjusting said outer hoop of said embroidery hoop; and means extending perpendicularly from said main portion for supporting said main portion so that when said embroidery hoop is mounted in said groove, the embroidery hoop will not cause the main portion to tip.

4,010,563
ANIMAL IDENTIFICATION TAG

Jackson T. Schwindt, Cody, Wyo., assignor to Y-Tex Corporation, Cody, Wyo.

Continuation-in-part of Ser. No. 459,292, April 9, 1974, abandoned. This application Feb. 6, 1975, Ser. No. 547,478
Int. Cl.² B09F 3/00
U.S. Cl. 40—301 37 Claims

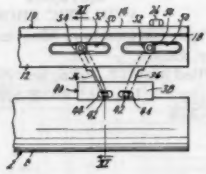


1. An improved animal identification tag comprising: a flat information-carrying portion having a surface on which indicia may be placed; a pin extending outwardly from the edge of said information-carrying portion in a direction generally parallel to said surface; laterally extending flexible prongs on the end of said pin; and a pair of flexible, resilient support members extending outwardly from said information-carrying portion adjacent to said pin, said support members being positioned to contact the surface of the ear of an animal when said prongs are passed through said ear.

4,010,564
SHOTGUN WITH ADJUSTABLE VENTILATED SIGHT RIB

Charles E. Pettit, Olathe, Kans., assignor to Simmons Gun Specialties, Inc., Olathe, Kans.

Filed Mar. 8, 1976, Ser. No. 664,562
Int. Cl.² F41G 1/00
U.S. Cl. 42—1 S 7 Claims

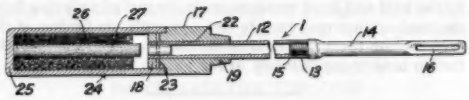


1. In a shotgun:
a. an elongated barrel,
b. an elongated sight rib assembly extending generally coextensively with and approximately parallel to said barrel, in spaced apart relation thereabove,
c. means connecting the rearward end of said assembly to said barrel for pivotal movement on a horizontal transverse axis, whereby said assembly may be tilted in a vertical plane relative to said barrel,
d. connecting means joining the forward end of said assembly to said barrel adjacent the muzzle end of the latter, and adjustable to vary the vertical angle of said assembly relative to said barrel, and
e. securing means operable to secure said connecting means against adjustment, whereby to secure said assembly at any desired degree of vertical angularity relative to the barrel, said connecting means including a connecting member joining said assembly and said barrel, and being slidably movable relative to said barrel in a direction longitudinal to said barrel, even when said connecting means is secured against adjustment by said securing means.

4,010,565
GUN CLEANING AND SAFETY DEVICE

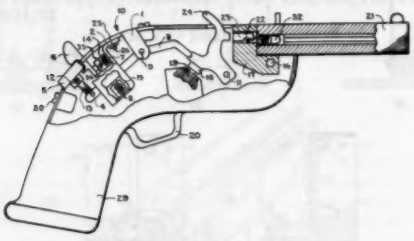
Peter DiProspero, 814 W. 25th St., Erie, Pa. 16502

Filed June 17, 1976, Ser. No. 697,137
Int. Cl.² F41C 31/00
U.S. Cl. 42—1 R 4 Claims



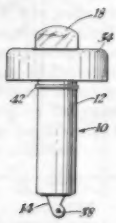
1. A cleaning kit and rod comprising a tube made of a thermoplastic material having a first end and a second end,
a tip on said first end having a reduced size end received in the first end of said tube and a flattened end on the second end of said tip with a slot for receiving a cleaning patch,
said reduced size end being received in said first end of said tube,
a cylinder member having a reduced size cylindrical end and a tapered end,
said tapered end being of a suitable size to fit into the muzzle of a gun of a size for which said kit is adapted,
a hole through said cylinder member, said second end of said tube extending through said hole and means holding said second end of said tube in said hole,
a hollow, cylindrical cup closed at one end and adapted to fit over said cylindrical end of said cylindrical member for containing cleaning material.

4,010,566
THUMB TRIGGER AND AUTOMATIC SAFETY
Walter William Edwards, Rte. 1 Box 265, Bruno, Minn. 55712
Filed Mar. 19, 1975, Ser. No. 559,672
Int. Cl.² F41C *19/00*
U.S. Cl. 42—69 R **8 Claims**



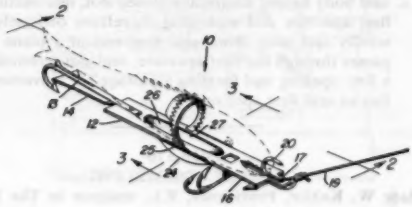
1. A thumb trigger and automatic safety comprising: a casing having two tabs for locating a pivot point thereon, a swinging arm pivoted about a pivot pin and secured thereby between said tabs, said arm having a clearance hole at said pivot point for receiving said pivot pin therein, said arm having a slot therein for receiving a perpendicular shaft, said arm having a hole therein for receiving a press fitted pin, said arm having a boss extending downwardly therefrom into a vertically oriented cylindrical tube containing a compression spring, said arm extending through a slot in a partially enclosed bracket mounted on said casing, said arm having an angled bend at one end thereof for engaging a firing striker, and means for mounting said casing in a firearm for actuation by a thumb trigger.

4,010,567
ILLUMINATED FISHING FLOAT
Russell James MacMillan, 4604 SW. 32nd Drive, Hollywood, Fla. 33021
Filed Dec. 22, 1975, Ser. No. 643,526
Int. Cl.² A01K *93/00*
U.S. Cl. 43—17.5 **2 Claims**



1. An improved illuminated fishing float comprising:
an elongated cylindrical receptacle having an open end including a plurality of threaded portions about said open end;
a translucent cap threadably engageable over the open end of said receptacle, said cap providing a watertight seal for said receptacle;
a battery mounted within said receptacle;
an electrical conductor;
a lightbulb mounted beneath said cap attached to said conductor and moveable to engage the contact of said battery, said conductor providing a complete circuit between said battery terminals and said lightbulb; and
a reversible donut-shaped floatation collar having an upper surface and a lower surface frictionally engaged about a portion of the exterior surface of said receptacle, said collar including an annular recessed lip adjacent said upper surface for receiving said translucent cap, said lip being recessed to allow positionable adjustment of the bulb within the cap relative to the upper surface of said collar whereby the illumination angle may be varied.

4,010,568
FISHING LURE WITH ATTACHABLE FLOAT MEANS
Wilburt W. Mays, 2020 N. 8th St., Philadelphia, Pa. 19122
Filed Nov. 17, 1975, Ser. No. 632,798
Int. Cl.² A01K *85/00*
U.S. Cl. 43—42.22 **9 Claims**



1. A live bait fishing lure having an elongated base formed of a length of plate with a fishhook at one end and having line attachment means at the opposite end, a spike projecting from said base closely adjacent to the line attachment point, said spike being adapted for impaling and securing a live bait thereon, said length of plate having fishhook guard means formed therewith, and fastening means in addition to the impaling means for fastening the body of the live bait to the main body of the lure, the fastening means for the body of the live bait includes a flexible fastening strap having leg portions which pass around the live bait and fasten same to the body portion of the lure, and the leg portions are ofset from each other.

4,010,569
CONNECTOR FOR FLEXIBLE LINES
T. J. Finley, and Gwendolyne Finley, both of 506 Countryside Road, Junction City, Kans. 66441
Filed Oct. 15, 1975, Ser. No. 622,768
Int. Cl.² A01K *91/04*
U.S. Cl. 43—44.83 **9 Claims**

1. A connector for lines and the like comprising:
a. an ellipsoidal body, having an elliptical longitudinal cross-section and being substantially uniform about the longitudinal axis with a circular transverse cross-section wherein:
1. said body is solid, one-piece, and constructed from a resilient material which is substantially impervious to corrosion; and

2. said body has first and second ends;

b. said body having first and second apertures extending transversely therethrough;

1. said apertures are cylindrical in shape;

2. the axes of said apertures define a plane which passes through the longitudinal axis of said body;

3. the diameters of said apertures are slightly greater in size than the diameters of fishing lines engaged therein, such that said line can freely rotate in said apertures; and

4. said first and second apertures being spaced an equal distance from said first and second ends respectively, and near thereto; and

c. said body having a normally closed slot, intersecting said first aperture and extending therefrom obliquely, outwardly and away from said first end in a plane which passes through the first aperture, said slot terminating in a first opening and forming a passage for movement of a line to said first aperture.

4,010,570

PUPPET ASSEMBLING

Marc W. Kohler, Providence, R.I., assignor to The Puppet Workshop, Inc., Providence, R.I.

Filed May 14, 1975, Ser. No. 577,410

Int. Cl.² A63H *3/14*

U.S. Cl. 46—154 **4 Claims**

1. A puppet comprising:

an exterior supporting tube and a unitary resilient foam core supported in said tube,

at least one end of said tube being opened to expose said foam core,

said foam core containing therein a longitudinally extending passage extending axially of said tube for receiving and gripping a finger extending through said one end,

said foam core completely filling the crosssection of said tube between said passage and said tube to give stability thereto,

said passage being transversely so small in area as to grip reliably even small fingers and said core being so yieldable as to accept reliably even large fingers.

4,010,571

AUTOMATIC LOADING DOCK

Winston B. McGuire, and Charles W. Mellyn, both of Hudson, N.Y., assignors to W. B. McGuire Co., Inc., Hudson, N.Y.

Filed Sept. 8, 1975, Ser. No. 611,240

Int. Cl.² E06B *7/00*

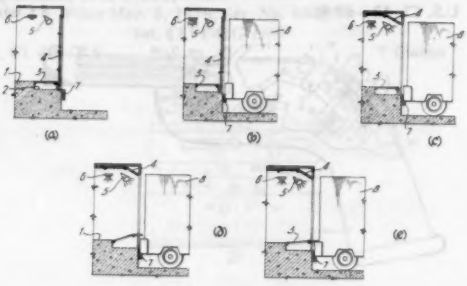
U.S. Cl. 49—70 **11 Claims**

1. A loading dock assembly adapted to be included in a building comprising:

a. a door for closing a loading opening in the building, above said dock,

b. automatic dock leveller means for providing a ramp bridging the bed of a truck and the dock, and

c. automatic control means for opening or closing the door and raising or lowering said dock leveller means,



d. said control means being arranged to open the door only when the truck bed is in a loading position and to raise the dock leveller upon the door being opened.

4,010,572

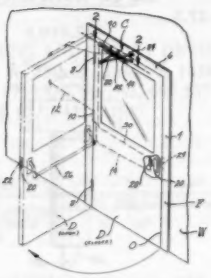
DOOR CLOSER HAVING MEANS TO NEUTRALIZE THE DOOR CLOSING FORCE EXERTED THEREBY

Francis C. Peterson, St. Louis County, Mo., assignor to C. Hager & Sons Hinge Manufacturing Company, St. Louis, Mo.

Filed June 2, 1975, Ser. No. 582,663

Int. Cl.³ E05F *15/04*, *3/22*

U.S. Cl. 49—386 **16 Claims**

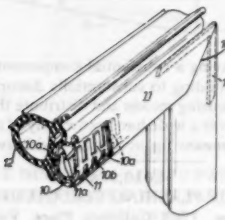


1. In combination with a door which moves between open and closed positions with respect to a door opening in a wall, the improvement comprising: force means for providing a restoring force when the door is opened; transfer means between the force means and the door for causing the restoring force to urge the door to its closed position; neutralizing means for at least in part neutralizing the force exerted by the force means when the door is opened by an individual desiring to pass through the door opening, the neutralizing means being an air cylinder including a barrel and a piston rod which moves relative to the barrel when the barrel is pressurized and which exerts a neutralizing force on the transfer means in opposition to the force exerted by the force means; and a valve carried by the door and connected between the air cylinder and a source of pressurized air for admitting the air to the air cylinder when activated.

4,010,573
SEALING OR TRIMMING STRIP STRUCTURE

Heinz Andrzejewski, Viersen, Germany, assignor to Draftex Development AG, Zug, Switzerland

Continuation of Ser. No. 330,410, Feb. 7, 1973, abandoned.
This application Mar. 13, 1975, Ser. No. 558,174
Claims priority, application United Kingdom, Feb. 18, 1972, 7521/72
Int. Cl.² E06B 7/232, 7/215
U.S. Cl. 49—479 7 Claims



1. A trimming or sealing strip structure comprising at least two mutually inclined channel-shaped portions each defined by first and second parallel and opposed side wall with a base between them, the two portions being mutually positioned and having respective ends mutually shaped to form a mitered joint between the two said portions with one end of each of the first and second side walls and the base of one channel-shaped portion being in contact with, respectively, one end of the first and second side walls and the base of the other channel-shaped portion, the channel openings of the two portions facing outwardly of the mitered joint,

each said channel-shaped portion comprising carrier means of relatively rigid material defining a U-channel and channel-shaped flexible covering material covering the carrier means, the flexible covering material being free of the relatively rigid material of the carrier means in the marginal regions running along the outer edges of the side walls of the channel-shaped portions, and

two longitudinal reinforcing members of substantially rigid material each embedded in a corresponding outboard peripheral part of the said marginal region of a respective one of two said first side walls, the reinforcing members each lying parallel to the outboard surfaces of the channel in which they are respectively embedded and extending along the said regions to the contacting ends of the said first side walls and there meeting each other proximate the outboard portion of the corner which said mitered joint forms whereby the flexible covering material at said outboard portion is stiffened.

4,010,574
APPARATUS FOR CONTOURING MAGNETIC HEAD SURFACES AND METHOD THEREFOR

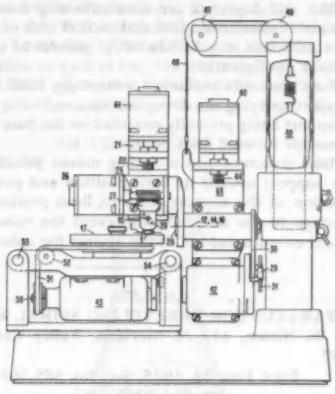
Louis B. Felerabend, and Otto R. Luhrs, both of Boulder, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 5, 1975, Ser. No. 555,650
Int. Cl.² B24B 11/00
U.S. Cl. 51—121 19 Claims

1. Apparatus for forming a contour defined by a first radius and a plurality of second radii originating on different axes, on a transducer surface held in contact at one point with a surface removal device, including:

first drive means for moving the contact point on said transducer surface in a first direction and its reverse along an arc defined by said first radius;

second drive means for reciprocating the contact point on said transducer surface in a second direction, and its reverse, intersecting said first direction along one of said plurality of second arcs defined by one of said second radii; and

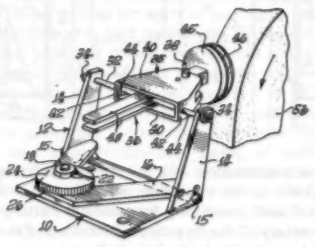


control means, connected to said first and second drive means, for causing the contact point to advance in said first direction while simultaneously reciprocating in the second direction.

4,010,575
DEVICE FOR GRINDING A CABACHON

Henry L. Henry, 7839 Aster Ave., Yucca Valley, Calif. 92284

Filed May 19, 1975, Ser. No. 578,924
Int. Cl.² B24B 11/00
U.S. Cl. 51—229 3 Claims



1. In a device to facilitate the grinding of the face of a cabochon of generally elliptical plan configuration to a curved convex configuration by a grinding wheel, the combination of:

a dop stick to hold an unfinished cabochon on one of its ends;

a holder for the dop stick;

a base structure;

first pivot means on the base structure pivotally supporting the holder for manual oscillation thereof about a first axis of rotation in the plane of the transverse center line of the plan configuration of the cabochon; and

second pivot means on the holder pivotally supporting the dop stick for manual oscillation relative to the holder about a second axis of rotation in the plane of the longitudinal center line of the plan configuration of the cabochon;

the distance of the first pivot means from the desired convex face of the cabochon being substantially equal to the desired radius of longitudinal curvature of the convex face of the cabochon,

the second pivot means being located between the cabochon and the first pivot means,

the distance of the second pivot means from the desired convex face of the cabochon being substantially equal to the desired radius of transverse curvature of the convex face of the cabochon;

whereby, when said device is positioned for use and the face of an unfinished cabochon on said dop stick is brought into proper grinding contact with said grinding wheel, the holder and dop stick are simultaneously movable about the above-mentioned first and second axes of rotation so that said face can be smoothly ground to said curved convex configuration;

said base structure including a normally fixed base and a support carrying the first pivot means;

the support being pivotally mounted on the base and having a normal forward limit position;

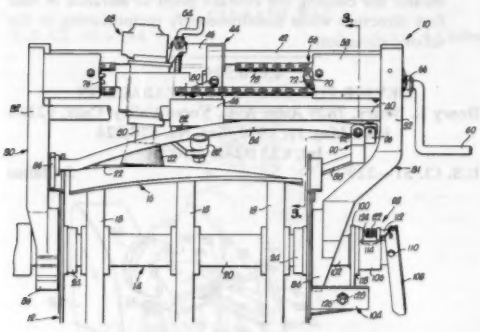
said base structure also including means yieldingly urging the support toward its limit position and permitting retraction of the support from its limit position to avoid damage to the device in the event the rotary grinding wheel exerts a sudden thrust against the cabochon.

4,010,576

APPARATUS FOR REBEVELING SPIRAL KNIVES

Roland N. Nissen, 112 N. Meridan, Valley Center, Kans. 67147

Filed June 23, 1975, Ser. No. 589,369
Int. Cl.² B24B *3/42*
U.S. Cl. 51—249 **10 Claims**



1. In combination with a cutting reel having a plurality of elongated knives extending helically about the periphery of the reel and presenting longitudinal cutting edges disposed transversely of the direction of rotation of the reel, apparatus for sharpening said edges including:

swingable support structure mounted for swinging movement about the axis of rotation of the reel;

a sharpener mounted on said structure for reciprocation relative to said structure transversely of the direction of swinging movement of the structure and adjacent the periphery of the reel; and

follower means coupled with said sharpener for reciprocation therewith,

said structure rocking about said axis during reciprocation of the sharpener in response to guiding of said follower means along a helical course of travel conforming to the orientation of said knives, thereby permitting the sharpener to remain properly engaged with the edge of an adjacent knife as the sharpener is reciprocated.

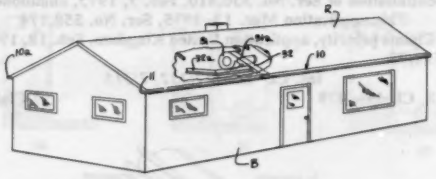
4,010,577

ROOF DRAIN SYSTEM

Gordon R. Stalter, 511 NE. 2nd St., Hopedale, Ill. 61747

Filed May 3, 1976, Ser. No. 682,332
Int. Cl.² E04H *9/00*
U.S. Cl. 52—1 **8 Claims**

1. A roof drain system comprising elongated housing means defining air duct having an upper wall portion and adapted for attachment to a building to extend lengthwise of at least a substantial portion of the lower edge of the roof whereby rain water from the roof flows over the upper wall portion of the housing means, blower means having an outlet communicating with said air duct for supplying air under super atmospheric pressure thereto, said housing means having aperture means along the length thereof for passing air from the air



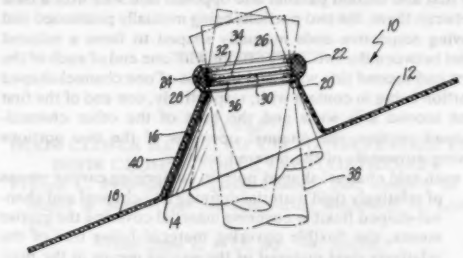
duct in streams having a substantial component laterally outwardly from the building to substantially disrupt the water as it flows over the housing means and distribute the water in the form of droplets over a wide band outwardly of the roof line of the building, and means for actuating said blower means.

4,010,578

ROOF FLASHING STRUCTURE

Duane D. Logsdon, 1708 Calavera Place, Fullerton, Calif. 92631

Filed Nov. 11, 1974, Ser. No. 522,788
Int. Cl.² E04D *1/36*
U.S. Cl. 52—58 **2 Claims**



1. A roof flashing structure for use on a roof so as to form a seal around a pipe extending through the roof which comprises:

a generally flat, imperforate plate adapted to overlie and fit against a roof, said plate having a centrally located opening of longer dimension than said pipe formed therein,

an upstanding, imperforate, tapered housing located on one side of said plate so as to extend outwardly from said side of said plate, said housing extending around said opening, said housing having an open end of larger dimension than said pipe located remote from said plate, said housing being of its largest dimension adjacent to said plate,

an annular retainer means for holding a sealing member located on said open end of said housing, said retainer means being capable of fitting around the exterior of said pipe, said retainer means comprising a ring, the interior of said ring having an inwardly facing groove formed therein, said groove having a curved, circular cross-sectional shape and extending completely around the interior of said ring, and

said plate, said housing and said retainer means being integral with one another and being formed of a rigid material,

a resilient, elastomeric sealing member held by said retainer means and extending from said retainer means towards the interior of said retainer means,

said sealing member having an outer surface conforming to the interior shape of said groove and including a plurality of separate sealing flanges extending therefrom toward the interior of said sealing member, each of said sealing flanges being capable of separately engaging said pipe,

said retainer means and said housing being of sufficient dimension so as to permit said plate to be positioned at a right angle to said pipe and at a plurality of other angles to said pipe,

said sealing member projecting inwardly from said retainer means a sufficient distance and being sufficiently flexible to form a seal with said pipe in all positions of said plate relative to said pipe.

4,010,579

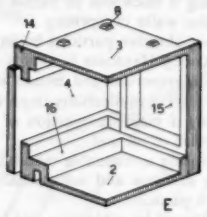
THREE DIMENSIONAL PRE-FABRICATED STRUCTURAL ELEMENTS FOR BUILDING HABITATION UNITS

Mario Galvagni, via Leonida Bissolati 22, Milan, Italy

Continuation-in-part of Ser. No. 452,668, March 19, 1974, abandoned. This application Sept. 29, 1975, Ser. No. 617,503

Int. Cl.² E04H *9/06;* **E04C** *3/10*

U.S. Cl. 52—79.8 **1 Claim**



1. A three-dimensional, pre-fabricated structural element for building habitation units comprising a plurality of self-supporting, sectional elements adapted to have standard sizes whereby to be assembled with other similar self-supporting elements to form a residential structure; each of said elements including a floor part and a ceiling part with two interposed wall parts formed integrally with said floor and ceiling parts to produce one of said self-supporting, sectional elements; said floor parts and wall parts together defining a generally rectangular space; each of said sections forming a complete self-supporting, standard size one-quarter portion of a conventional residential room; certain of said floor, ceiling and wall parts being integrally formed with stiffening ribs and certain of said wall parts having door and window apertures formed therein, other non-stiffening ribs being provided integral with said floor and wall parts, said other ribs being shaped to provide support means for differently shaped pieces of furniture; preformed passages being provided within said parts of an element to form channels for receiving pipes and electrical wiring for utilities; interengaging fitting means including fastenings formed integrally on the outside of said floor, wall and ceiling parts; said one-quarter sectional elements being adapted to be fastened together, in groups of four to form any one of a number of conventional residential rooms; and a plurality of such assembled rooms being adapted to be assembled together to form a residential complex; said interengaging fitting means being adapted to be readily disengaged and re-engaged, said self-supporting standard size elements being constructed and arranged to be selectively fitted together to form said different types of rooms in said residential complex and said individual elements being removable from one assembly and then interchangeable with one another, whereby the residential pattern of rooms may be selectively rearranged and altered as desired.

4,010,580

TUBULAR STRUCTURE

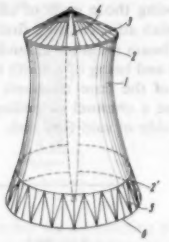
Gunter Mayr, Wolfschlugenerstrasse 16; Fritz Leonhardt, Lenzhalde 16; Wolfhart Andra, Lenzhalde 16; Willi Baur, Lenzhalde 16; Wilhelm Zellner, Lenzhalde 16, and Jorg Schlaich, Lenzhalde 16, all of Stuttgart, Germany

Continuation-in-part of Ser. No. 401,121, Sept. 26, 1973, abandoned. This application June 20, 1975, Ser. No. 588,868

Claims priority, application Germany, Sept. 26, 1972, 2247179

Int. Cl.² E04B *7/14, 1/06*

U.S. Cl. 52—80 **10 Claims**



1. An industrial cooling tower comprising a support structure resting on a ground surface and a waisted tubular envelope consisting of a continuous membrane having an unbroken surface of saddle shape and made of a material which is capable of supporting tension in all directions in its plane, said membrane being pre-tensioned and carried with its tubular axis upright from said support structure, an open latticework anchoring the lower border of said membrane to the ground surface and providing an inlet for entry of cooling air into the interior of said membrane, said membrane having an open upper end serving as an air outlet opening and a ring connected to the upper border of said membrane and to said support structure with said envelope stretched in an axial direction between its upper and lower borders, and with said support structure providing the vertical component of said pre-tensioning, said support structure being of sufficient strength to support said membrane in a sufficiently stretched condition to cause said pre-tensioning to create tensile forces in said membrane in all directions in the plane of said waisted envelope, with said tensile forces being greater than the compression forces created by the wind externally to said shell, whereby said tensioned membrane becomes a self-supporting membrane shell.

4,010,581

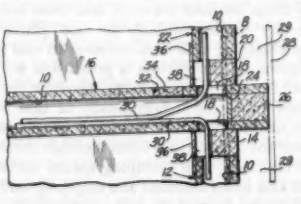
CORED SLAB BUILDING CONSTRUCTION

Raymond C. Keturi, 129 Kantishna Way, Fairbanks, Alaska 99701, and Wayne R. Sandstrom, P.O. Box 1993, Fairbanks, Alaska 99707

Filed July 17, 1975, Ser. No. 596,638

Int. Cl.² E04B *5/48*

U.S. Cl. 52—220 **2 Claims**



1. In a building construction employing precast concrete

slabs having generally parallel core channels extending therethrough from one edge to an opposed edge between opposed faces thereof, the improvement comprising:

a first of said slabs arranged to define an upstanding wall with its core channels extending vertically;

a second of said slabs arranged generally horizontally with its core channels extending perpendicular to said first slab and with said second slab extending across the upper edge of said first slab;

said second slab having at least one opening through its face adjacent said edge of said first slab, said opening being between the faces of said first slab and communicating with one of the core channels of said second slab;

plug means closing those ends of all the core channels of said second slab adjacent said first slab; and

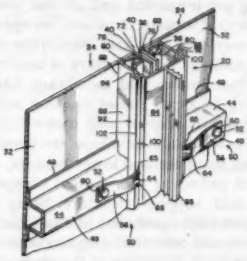
a solid precast beam member extending along said edge of said first slab and being of a width to cover only a portion of the ends of the core channels of said first slab and thereby define a channel extending along said edge and open at one side of said first slab.

4,010,582

BUILDING STRUCTURE

Kermit H. Burgin, Rte. No. 1, Box 334, Whitestown, Ind. 46075

Filed Sept. 24, 1975, Ser. No. 616,394
Int. Cl.² E04B *2/60*
U.S. Cl. 52—282 **8 Claims**



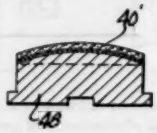
1. In a building structure comprising an elongated frame member having a plurality of longitudinally extending walls, one wall having a longitudinally extending slot therethrough, said frame member further having a pair of opposed parallel walls extending from the side edges of said slotted wall, each of the longitudinal edges of said slot having a planar leg extending therefrom generally perpendicularly into said frame member and parallel to said opposed walls, each said leg terminating interiorly of said member, a pair of elongated enclosing panels each having a longitudinal planar flange extending generally perpendicularly from an edge thereof, said panels being positioned approximately edge to edge along said slot with said flanges entering said slot and lying respectively along each of said legs, each of said panels having at least one cross member thereon, said cross members extending generally perpendicularly to said planar flanges, and means for clamping said cross member to said frame member, the improvement comprising a protrusion on each said opposed wall for bearing said cross members thereagainst, said protrusions extending longitudinally of said frame member, each protrusion having two sides, one of said sides facing said slotted wall for bearing said cross member thereagainst and an opposite rear side, said clamping means including a clip attached to said cross member and engaging said rear side, said rear side being formed to have a longitudinally extending outer edge serving as a ridge and to incline inwardly and toward said slotted wall from said outer edge.

4,010,583

FIXED-SUPER-ABRASIVE TOOL AND METHOD OF MANUFACTURE THEREOF

Carle W. Highberg, Sylvania, Ohio, assignor to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Continuation-in-part of Ser. No. 473,915, May 28, 1974, abandoned. This application Apr. 17, 1975, Ser. No. 569,303
Int. Cl.² B24B *13/02*; **B24D** *3/10, 7/10*
U.S. Cl. 51—284 **3 Claims**



1. A method of manufacturing a super-abrasive tool for grinding and polishing purposes and having a curvilinear working surface of predetermined desired conformation comprising the steps of:

a. providing a substantially-rigid, non-abrasive backing member having a curved support surface determinative of the curvature of said curvilinear working surface;

b. disposing adjacent said support surface a substantially-malleable, multi-layered, integrally-formed abrasive wafer of predetermined thickness contour having a substantially smooth surface and an abrasive-containing surface, including a thickness in excess of about 1/32 inch, said abrasive wafer comprising

i. a layer of super-abrasive particles having uniform surfaces and a Knoop Hardness in excess of about 3000 kg/mm² and interspersed and bound in a powdered metal matrix having malleability-imparting properties and comprising a major proportion of copper and a minor proportion of tin and

ii. a layer comprising a malleable metal having substantially smooth surfaces and substantially free of said super-abrasive particles,

said wafer being formed by subjecting said layer of malleable metal and said layer of super-abrasive particles interspersed in a powdered metal binder to sintering conditions of pressure and temperature for the metals to form said multi-layered integrally-formed abrasive wafer;

c. causing the substantially smooth surface of said abrasive wafer to conform to said support surface so as to impart said predetermined desired conformation as to the exposed abrasive-containing surface of said abrasive wafer by interposing said wafer between said support surface and an opposed surface conformable to the predetermined desired conformation and thereafter bringing said support surface and said opposed surface towards one another with sufficient force to accomplish such conformation;

d. releasably securing the conformed wafer of (c) to said backing member.

4,010,584

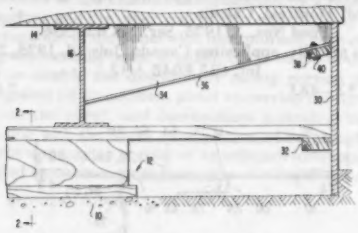
MOBILE HOME FOUNDATION

Bennett H. Barnes, Jr., Charlottesville, Va., assignor to Barnes Lumber Corporation, Charlottesville, Va.

Filed May 21, 1976, Ser. No. 688,819
Int. Cl.² E02D *27/32*; **E04C** *1/32*
U.S. Cl. 52—299 **5 Claims**

1. A mobile home foundation adapted to be mounted directly on a gravel support bed comprising at least one wood plank adapted to rest on the gravel bed and extend transversely of the longitudinal axis of the mobile home, a wood beam secured to the upper surface of said plank, a wood top

plate secured to the top of the beam and extending into close proximity to the sides of the mobile home, nailing strips se-



cured to the ends of said plate perpendicular thereto and skirt means for the mobile home secured to said nailing strips.

4,010,585

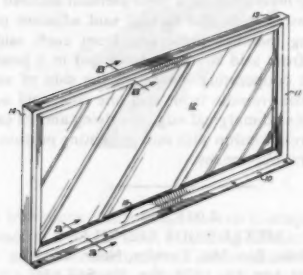
STRUCTURAL FRAME - WINDOW PANE ASSEMBLY

Thomas G. Bliven, 1834 N. 87th St., Scottsdale, Ariz. 85257

Filed Nov. 5, 1973, Ser. No. 412,739

Int. Cl.² E06B *3/62*; **E06B** *3/22*; **E04F** *19/06*

U.S. Cl. 52—308 **1 Claim**



1. A combination structural frame - window pane assembly comprising, in combination:

a. a single-piece continuous frame member formed of moldable plastic and having an elongate slot formed in one side thereof, said slot being shaped and dimensioned to slidably receive a window pane member therethrough, said frame member being shaped and dimensioned to completely enclose the periphery of said pane member when fully inserted through said slot;

b. a pair of spaced, inwardly projecting, resiliently deformable flanges formed integrally with the inner periphery of said frame member, said deformable flanges being normally spaced a distance smaller than the thickness of said pane and being further shaped and dimensioned to be resiliently deformed and spaced apart by the edges of said pane when inserted therebetween to provide a line of sealing engagement between said flanges and said pane, said line of sealing engagement being at least equal to the thickness of said pane; and

c. a window pane member shaped and dimensioned to be inserted through said slot and retained within said frame by the line of sealing engagement of the edges thereof between said inwardly projecting flanges,

the complete combination structural frame - window pane assembly being effected by the single step of inserting said window pane member through said slot to said line sealing engagement position.

4,010,586

METHOD FOR THE MANUFACTURE OF REINFORCEMENT MEMBERS AND MEMBER MANUFACTURED BY THE METHOD

Fritz W. Brechbuhler, Koniz, Switzerland, assignor to Gebr. Zehtner AG (Armierungs-Unternehmung), Bern, Switzerland

Filed Feb. 12, 1975, Ser. No. 549,204

Claims priority, application Switzerland, Feb. 27, 1974, 002872/74

Int. Cl.² E04C *1/00*

U.S. Cl. 52—309.16 **1 Claim**

1. A reinforcing member for connecting portions of contiguous structural parts comprising a prismatic body of synthetic foam having an isoceles trapezoidal cross-section, and reinforcing irons each of a U-shaped configuration and having an arch extending at right angles from the widest face of said body and the legs of each iron being bent and embedded in said body in proximity to the narrowest face of said body.

4,010,587

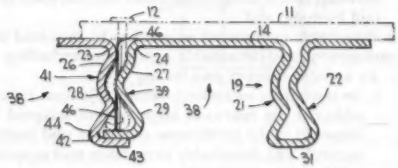
NAILABLE FLOORING CONSTRUCTION

Glen D. Larsen, 9805 Broadmoor Terrace, Upper Marlboro, Md. 20870

Filed Sept. 7, 1976, Ser. No. 720,678

Int. Cl.² E04B *5/10*

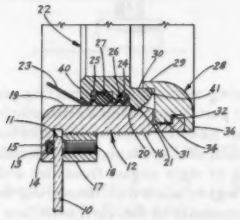
U.S. Cl. 52—377 **7 Claims**



1. A nailable floor construction unit, comprising: an elongated sheet having an upper wall with opposed longitudinal edges; elongated side walls respectively joined along said edges and extending in a common direction perpendicular to said upper wall; elongated flanges parallel to said upper wall and respectively joined to said side walls; said upper wall having roll-formed therein at least one longitudinal serpentine nailing groove extending in said common direction and defined by a pair of spaced walls, said groove walls including first wall sections respectively joined to said upper wall and being rounded relative thereto, said groove walls further including second wall sections respectively joined to said first wall sections and sloping in a direction toward one of said side walls, said groove walls still further including third wall sections respectively joined to said second wall sections and sloping in a direction toward the other of said side walls, and a bottom wall section having a leg forming together with said third wall sections a substantially triangular cross-sectional base for said groove, and edge of said bottom wall section joining one of said third wall sections and said leg joining the other of said third wall sections and sloping in a direction parallel to said second wall sections, and said bottom wall section lying in a

plane common to at least one of said flanges; whereby flooring may be secured to said unit with the use of nail fasteners held in place as they are deformed by said wall sections during insertion into said groove and whereby said triangular base of said groove increases the structural strength of said groove and said bottom wall section closes said groove against the entry thereinto of any dirt, debris or heat from fire from outwardly of said bottom wall section.

4,010,588
SEALING DEVICE
Gerald A. Eisert, Hastings, Minn., assignor to Central Research Laboratories, Inc., Red Wing, Minn.
Filed Oct. 19, 1973, Ser. No. 408,189
Int. Cl.² A61G 11/00
U.S. Cl. 52—398 **4 Claims**



1. A sealing device for joining a detachable component to a rigid wall, said device comprising:

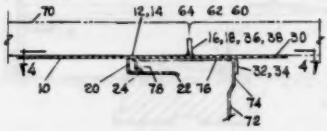
A. a hand hole bushing having a forward edge and a rearward edge and adapted to be fixedly and sealedly secured within an opening in a rigid wall and having a passageway therethrough, said bushing including:

1. a continuous sealing surface extending around the perimeter of said passageway, and
2. a continuous groove adjacent said sealing surface, between said sealing surface and the rearward edge of said bushing; and

B. a detachable component adapted to be mounted in said passageway, said detachable component including:

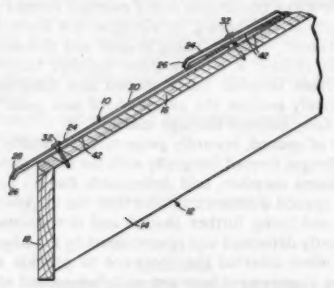
1. an annular support ring having
   a. an outwardly extending, deformable semi-rigid bead adjacent the rearward edge thereof adapted to be disposed in the continuous groove of said bushing to securely and detachably immobilize said support ring within said passageway,
   b. a continuous channel spaced from said bead and extending around the outer periphery of said support ring,
   c. a further continuous groove extending around the outer perimeter of the support ring adjacent to said bead in the space between said bead and channel to facilitate deformation of said semi-rigid bead, and
   d. a deformable sealing ring of circular cross-section seated in said channel and extending beyond said channel, the outside periphery of said sealing ring being of greater diameter than the periphery of said continuous sealing surface of said passageway, and
2. leak-proof means for preventing the passage of undesired material through the central opening of the support ring, said leak-proof means including a glove of flexible and leak-proof material, said glove having a beaded cuff,
   a. the cuff of said glove being stretched over the outer periphery of said support ring,
   b. the bead on the cuff of said glove being disposed in said further continuous groove, and
   c. a portion of said cuff underlying said sealing ring in said channel.

4,010,589
PANEL MOUNTING
Charles Fleming Gross, Montreal, Canada, assignor to Domtar Limited, Montreal, Canada
Filed Nov. 3, 1975, Ser. No. 628,336
Claims priority, application Canada, July 18, 1975, 231797
Int. Cl.² E04B 5/52
U.S. Cl. 52—483 **7 Claims**



1. A system for securing panels to structural members comprising a first panel, a plurality of discrete first clip means, each having a substantially flat plate with flange means projecting substantially perpendicularly therefrom, means for securing a plurality of said first clip means in spaced relationship to said first panel with said flange means projecting from one face of said first panel, said plate in face to face relationship with said one face and with a portion of said plate projecting laterally beyond one side edge of said first panel, said flange means engaging one side of one of said structural members, an adjacent panel, a plurality of discrete second clip means, means for securing a plurality of said second clip means in spaced relationship to a face and along one marginal edge of said adjacent panel, said faces of said first and said adjacent panels facing towards said structural members, each said second clip means having a plate element secured in face to face relationship with said face of said adjacent panel, a resilient locking member projecting from each said plate element away from said adjacent panel and in a position to cooperate with cooperating means on the side of said one structural member remote from said one side, said adjacent panel having its said marginal edge overlying and its said face in face to face relationship with said projecting portion of said plate of said first clip means.

4,010,590
METAL ROOF SHINGLE
Richard F. Reinke, Box 566, Deshler, Nebr. 68340
Filed Apr. 16, 1975, Ser. No. 568,616
Int. Cl.² E04D 1/00
U.S. Cl. 52—533 **7 Claims**



1. A shingle comprising a metallic panel having substantially parallel end edges and substantially parallel top and bottom edges arranged perpendicular to the end edges, said panel including a plurality of corrugations formed therein with symmetrically curved transverse surfaces extending between the top and bottom edges, the bottom edge portion of the panel being downwardly bent along a bend line parallel to and adjacent to the bottom edge of the panel, said panel being straight from the bend line to the top edge one end edge of the panel

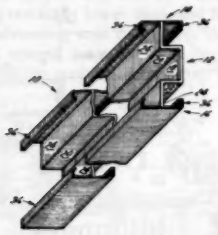
having a shallow channel formed therein with one wall of the channel being defined by an upturned end edge on the panel, the bottom of the channel being defined by a relatively wide flat surface and the other wall of the channel being defined by a corrugation in the panel with the upturned edge of the panel being substantially equal in height to the height of the corrugations to enable the downwardly facing portion of the end corrugation on an adjacent panel to overlap the upturned end edge on the panel, said corrugations extending through the bend line with the lower edge portion of the shingle overlapping the upper edge portion of an adjacent lower shingle when installed in courses on the exterior of a building or the like.

4,010,591

MOVABLE PARTITION TRIM PIECE

Charles Fleming Gross, Montreal, Canada, assignor to Domtar Limited, W. Montreal, Canada

Filed Nov. 3, 1975, Ser. No. 628,335
Claims priority, application Canada, Nov. 29, 1974, 214954
Int. Cl.² E04C *3/30, 2/33*
U.S. Cl. 52—732 **3 Claims**



1. A trim piece comprising a central U-shaped base member composed of a pair of arms extending substantially perpendicular to and in substantially the same direction from opposite ends of a base section and a pair of T-shaped members each formed of a trunk section and a pair of branch sections extending perpendicular to and in opposite direction from one end of said trunk section, the opposite end of each trunk section being integrally connected to a free end of one of said arms, said trunk sections extending substantially perpendicular to said arms and said branch sections adjacent said arms terminating in free ends positioned in a plane containing the face of said base section remote from said trunk sections.

4,010,592

TEMPLATE FOR AND METHOD OF CUTTING COMPOSITION SHINGLES FOR RAPID AND SCRAP-FREE INSTALLATION

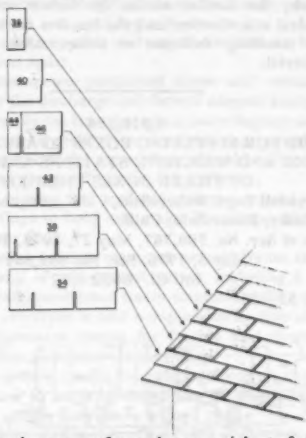
Roy Nixon, 133 W. Pole Road, Lynden, Wash. 98264

Filed Jan. 16, 1976, Ser. No. 649,849
Int. Cl.³ E04D *3/32, 15/02*
U.S. Cl. 52—748 **8 Claims**

8. A method of applying shingles upon a gabled roof comprising the steps of:

a. cutting three 18 inches composition shingles into seven pieces of the size 15 ⅜ inches, 12 inches, 1 ¼ inches 7 ¾ inches, 6 inches 5 ⅛ inches and 2 ⅜ inches respectively,

b. using the cut shingles in the order of decreasing size to start the next seven rows following the first which utilizes a full width shingle, and



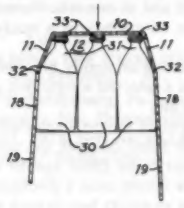
c. repeating the process for each sequential set of eight rows or part thereof to be peak of the roof.

4,010,593

METHOD FOR PACKAGING BOTTLES

Robert H. Graham, E. 1527 Rockwood Blvd., Spokane, Wash. 99203

Division of Ser. No. 559,782, March 19, 1975. This application June 21, 1976, Ser. No. 697,857
Int. Cl.² B65B *21/14, 21/22*
U.S. Cl. 53—29 **3 Claims**



1. A method of forming a package for two or more rows of upright capped bottles from a carton blank having spaced top, bottom and side panels composed of slightly resilient or compressible material such as corrugated cardboard or the like, the top panel having an interior length and width slightly less than the total length and width, respectively, across the caps of the bottles;

the method comprising the following sequential steps:

a. folding and securing upper sloping side and end walls depending from the top panel to produce an open enclosure having folded edges located in a plane parallel to the top panel;

b. locating the enclosure in a downwardly-open position immediately above the rows of bottles;

c. placing the blank onto the rows of bottles so that the bottle necks are received within the enclosure with the caps engaged against the inner surfaces of the top panel and the respective sloping side and end walls at fold lines connecting them to the top panel, thereby tilting the upper ends of the bottles slightly toward one another;

d. and urging the bases of the bottles toward one another by wrapping lower rectangular side and end wall panels of the carton about them and joining bottom panels of the carton under the bottles to return the bottles to parallel

upright positions in engagement with one another within the completed carton;

whereby the bottles within the carton are held tightly against one another and the interior carton surfaces by the resulting resilience or compression of the carton material.

4,010,594

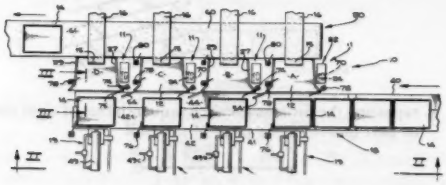
METHOD FOR SUPPLYING BOXES TO A PLURALITY OF FILLING AND WEIGHING STATIONS AND REMOVAL OF FILLED BOXES THEREOF

Jerry Lyndell Boyd, Bakersfield, Calif., assignor to Stanley A. McClusky, Bakersfield, Calif.

Division of Ser. No. 580,767, May 27, 1975. This application May 3, 1976, Ser. No. 682,561

Int. Cl.² B65B *1/32*

U.S. Cl. 53—35 **11 Claims**



1. In a method of filling and weighing a plurality of boxes at a plurality of weighing scales arranged in a line, article feed means above each scale, each box being filled and discharged independently of the other boxes at said scales, an empty box feed belt, and a filled box discharge belt, the steps of:

supplying an empty box at each scale in accordance with the demand for an empty box at each scale including

advancing empty boxes in a line parallel to the line of weighing scales and at one side thereof,

stopping an empty box in a ready position opposite each scale,

laterally moving an empty box onto a scale when the scale measures a selected weight in a peceeding box bein filled on the scale;

filling the empty box to a selected weight,

moving the filled box off the scale by pushing the next empty box to be filled against said filled box until said filled box moves onto a discharge conveyor belt,

and moving an empty box to each vacated ready position by successively advancing empty boxes in said line to occupy vacated ready positons wherever and whenever the vacated positions occur.

4,010,595

APPARATUS FOR SUPPLYING BOXES TO A PLURALITY OF FILLING AND WEIGHING STATIONS AND REMOVAL OF FILLED BOXES THEREOF

Jerry L. Boyd, Bakersfield, Calif., assignor to Stanley A. McClusky, Bakersfield, Calif.

Filed May 27, 1975, Ser. No. 580,767

Int. Cl.² B65B *1/32, 57/02, 57/10*

U.S. Cl. 53—55 **20 Claims**

13. In a machine for filling boxes in which the machine includes a plurality of spaced sequentially arranged filling stations, the provision of:

means for supplying an empty box to each filling station as required by each station;

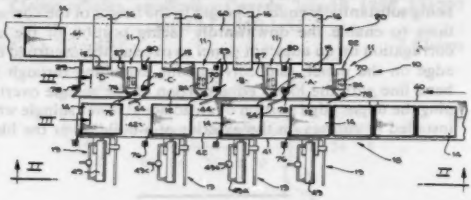
said box supplying means including

a conveyor section having a continuously moving belt passing along one side of the filling stations for receiving and advancing boxes to a ready position at each filling station,

means for releasably detaining an empty box in said ready position opposite each filling station,

means at each filling station for sensing the fill condition of a box at the station,

means for moving a box from ready position toward said filling station upon the sensing of a full box in said station,



and means for causing an empty box to occupy the box ready position on the moving belt when the box ready position is vacated.

4,010,596

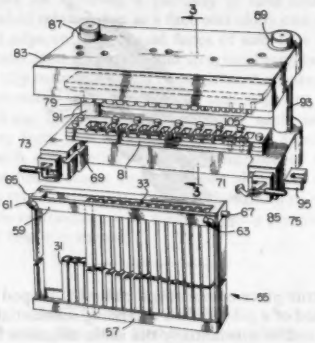
MOLDED PART SEPARATION AND STORAGE

Anthony H. Osterhoit, 4608 Euclid Ave., Fort Wayne, Ind. 46806

Filed July 21, 1975, Ser. No. 597,822

Int. Cl.² B65B *63/00*; B26D *5/08*

U.S. Cl. 53—123 **8 Claims**



1. In a punch and die press to separate molded parts from a common sprue and accumulate like separated parts from successive sprues for subsequent utilization and having cooperating punch and die means actuable by the press for severing the parts from the sprue with a single press stroke, the combination therewith of accumulator means for receiving and retaining like severed parts in a single column stacked relation;

said accumulator means comprising an elongated sheath defining a part-receiving sheath passage and having a cross-section in a plane normal to the direction of elongation of generally the same configuration as the parts; the sheath having first opposed side wall portions for gripping the parts and second opposed side wall portions deformable toward one another to urge the first opposed side wall portions away from one another and release parts gripped therebetween.

4,010,597

APPARATUS FOR CLOSING AND SEALING TWO-PIECE SLOTTED CONTAINERS

Iver L. Nelson, Minneapolis, Minn., assignor to Hoerner Waldorf Corporation, St. Paul, Minn.

Filed July 1, 1976, Ser. No. 701,983

Int. Cl.² B65B *7/20, 51/02*

U.S. Cl. 53—374 **4 Claims**

1. Apparatus for closing and sealing the flaps of and gluing

together containers which are of the type assembled from a slotted tray with no top closure flaps and an outer sleeve which telescopes over the erected tray, which outer sleeve has top flaps hingedly attached thereto and foldable into position to form the top closure for the container, wherein said tray is erected and said sleeve is positioned thereon and the contents for the carton are loaded into said tray prior to being placed in said apparatus for sealing, said top closure flaps including major flaps on either lateral side of said container as it is presented to said apparatus and minor closure flaps on both the leading and trailing edges of said container as it is inserted into said apparatus comprising:

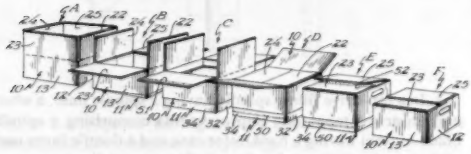
a frame supporting said apparatus;

an in-feed conveyor positioned at one end of said apparatus onto which said container may be located, said conveyor adapted to move said container into said apparatus and having positioned above said conveyor first cam rail means for engaging said major top closure flaps on either lateral edge of said container and rotate them outwardly and downwardly into a horizontal position as said container moves along said in-feed conveyor;

means mounted on said frame and positioned along the sides of said conveyor for orienting said container as it moves along said conveyor to properly position said container for entry into said apparatus;

a center section including a stepped support conveyor of freely rotatable rollers having a first section at the same elevation as said in-feed conveyor and a second section positioned vertically lower than said first section;

means for advancing said containers through said center section at spaced intervals including a pair of chains driven in unison positioned on either side of said center



section with pairs of bars extending laterally between said pair of chains adapted to contact the trailing edge of said container and push it through said center section;

means driving said pair of chains in unison and means for directing said pairs of chains substantially horizontally above the surface of said stepped conveyor in said center section;

means for restraining said containers at the end of said in-feed conveyor, said restraining means automatically disengagable by the passing of said bars on said means for advancing containers as said bars are directed past said restraining means, said restraining means being positioned at the discharge end of said in-feed conveyor and near the point at which said containers are moved into said center section;

means positioned above said center section to engage the outwardly folded lateral major closure flaps of said container and support said outer sleeve in a vertical plane so that when said container is moved onto said lower conveyor section said sleeve and said tray are telescoped apart a predetermined distance;

fixed means for moving the minor closure flap on the leading edge of said container down into position on the top of said sleeve;

rotating plow means positioned above said center section and adapted to rotate downwardly and in the direction of the movement of said container in synchronous motion with the passing of said container to fold said trailing closure flap on said container down into position;

means for synchronizing the movement of said bars on said means for advancing said containers through said center section and said rotating plow means to insure that said rotating plow means operates in unison with the passing of each of said containers;

means positioned along said center section for sensing the presence of and applying adhesive to the outer lateral sides of said tray after said tray and said sleeve have been telescoped apart;

second plow means positioned above said center section and near the discharge end thereof adapted to engage and fold inwardly the lateral major closure flaps on said sleeve and completely fold them down into horizontal position juxtaposed with the top surface of said leading and trailing minor closure flaps on said container;

means for sensing and applying adhesive to said container closure flaps to hold said major flaps in position against said minor flaps;

a compression section mounted on said frame at the discharge end of said center section, including a series of horizontally positioned freely rotatable rollers to form a support conveyor in said compression section along with top compression means for forcing said sleeve downwardly into position over said tray;

side compression means for exerting force on the sides of said sleeve to enhance the setting of said adhesive and thereby sealing said sleeve to said tray;

said top compression means and side compression means operable in unison and controlled by means for sensing the presence of said container in said compression section together with means for sensing an approaching container in said center section in order to retract said top compression and said side compression means; and

a retention and discharge section comprising rollers mounted at predetermined distances above said container as well as along the sides of said container to hold said top flaps and said sleeve and tray together to insure proper setting of said adhesive prior to removal from said apparatus, said containers moveable into said section by contact with subsequent containers being discharged from said center section.

4,010,598

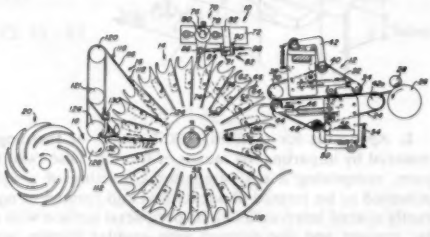
DEVICE FOR FOLDING THE CLOSURE FLAP OF ENVELOPES

Heinz Jakob Mueller, Hollidaysburg, Pa., assignor to F. L. Smithe Machine Company, Inc., Duncansville, Pa.

Filed Feb. 27, 1975, Ser. No. 553,640

Int. Cl.² B65B 7/20

U.S. Cl. 53—376 **5 Claims**



1. A device for folding the closure flaps of envelopes comprising,

a rotatable receiver having a plurality of discs mounted on a shaft,

each of said discs having a plurality of radially extending spaced slotted portions with radially extending finger portions therebetween,

first conveyor means positioned on one side of said rotatable receiver, said first conveyor means arranged to feed envelopes with open closure flaps into said receiver slotted portion with the envelope bottom edge as the leading edge of the envelope,

an envelope guide member positioned adjacent to said receiver slotted portions, said guide member arranged to abut the envelope bottom edge and move the envelope within the slot to a location where the envelope closure flap extends outwardly beyond the periphery of said receiver member,

an arcuate flap folding member positioned adjacent the periphery of said receiver member, said flap folding member operable to partially fold the envelope closure flap of envelopes positioned in said receiver slotted portions as said receiver member slotted portions rotate away from said first conveying means,

said rotatable receiver finger portions having a generally rectangular edge portion arranged to abut the envelope adjacent the closure flap score line,

second conveying means positioned on the other side of said rotatable receiver,

a pair of pressure rolls positioned adjacent to said second conveying means,

said second conveying means arranged to convey the envelopes with the partially folded closure flap outwardly from said receiver member slotted portions and between said pressure rolls, and

said pressure rolls arranged to crease the envelope closure flap along the closure flap score line and thereby complete the fold of the closure flap.

4,010,599

PROCESS AND APPARATUS FOR TEXTURING TEXTILE YARNS OF THERMOPLASTIC MATERIAL BY IMPARTING TWIST BY FRICTION

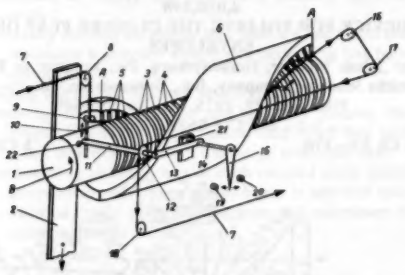
Walter Lüthi, Ebnat-Kappel, Switzerland, assignor to Heberlein Maschinenfabrik AG, Wattwil, Switzerland

Filed June 9, 1976, Ser. No. 694,437

Claims priority, application Switzerland, June 16, 1975, 7798/75; Feb. 25, 1976, 2350/76

Int. Cl.² D01H *7/92, 13/04*; D02G *1/04*

U.S. Cl. 57—34 HS **20 Claims**



1. Apparatus for texturing textile yarns of thermoplastic material by imparting, by means of friction, false-twist to the yarn, comprising a twist imparter consisting of a cylinder mounted to be rotated about its axis and formed at equidistantly spaced intervals along its peripheral surface with circular grooves and also formed with annular friction surfaces respectively located between each pair of adjacent grooves, means for rotating said cylinder about said axis, a fixed support element extending along and spaced from said cylinder, a series of rod-shaped thread-guides allocated respectively to said grooves and fixed to said support element, said thread-guides being of such length and so positioned on said support element that they project into said grooves at points located on a notional helical curve extending along said cylinder, input guide means including first yarn tension sensing means for directing yarn to one end of said cylinder, output guide means including second yarn tension sensing means for directing yarn output from the other end of said cylinder, said input and output guide means being located for the yarn to bear on at least a portion of said series of thread-guides while contacting said annular friction surfaces along the portion of said cylinder and extending along said portion of said series, and means responsive to said first and second tension sensing means enabling a difference between the input and output yarn tensions to be registered,

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4,010,600

RETIPPED TOP-DRIVE FILLING SPINDLES

Ernest G. Poole, Charlotte, and Lucius M. Hair, Pineville, both of N.C., assignors to The Kendall Company, Boston, Mass.

Filed Apr. 16, 1975, Ser. No. 568,560

Int. Cl.² B65H *54/54*

U.S. Cl. 57—129 **6 Claims**

1. In a top-drive filling spindle having a spindle base, a whorl and an acorn taper, the improvements comprising a spindle blade of steel having a hard outer case and a ductile inner core with a neck portion of reduced diameter at the uppermost portion of said spindle blade; and, a tapered tip portion of uniformly hardened material secured over said neck portion in butting relationship with said spindle blade.

4,010,601

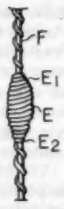
METHOD FOR MANUFACTURING A FANCY TEXTURED YARN PROVIDED WITH SLUBS

Meiji Anahara, Kyoto; Tsugio Take, Takatsuki, and Yutaka Kajihara, Akashi, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed June 24, 1975, Ser. No. 589,919

Int. Cl.² D02G *3/34, 3/38*

U.S. Cl. 57—160 **12 Claims**



1. Method for manufacturing a fancy textured yarn provided with numerous fancy slubs by means of a false twisting apparatus provided with a false twisting member and a heater disposed at a twisting zone upstream of said false twisting member, comprising supplying at least one multifilament yarn

A and at least one multifilament yarn B into said twisting zone independently, combining said yarn B with said yarn A at a wrapping point reciprocally moving along the yarn passage of said yarn A in said twisting zone, displacing said wrapping point toward the running direction of said yarn A at a speed in a range between less than the running speed of said yarn A and approximately 0.5 times that of said running speed and heating the thus formed composite yarn in said twisting zone.

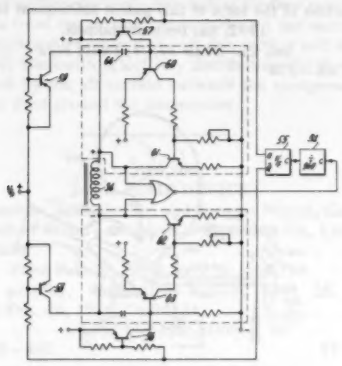
4,010,602
HIGH FREQUENCY REED TIME GOVERNOR FOR A TIMEPIECE

Paul Wuthrich, Watertown, Conn., assignor to Timex Corporation, Waterbury, Conn.

Continuation-in-part of Ser. No. 445,172, Feb. 25, 1974, abandoned. This application June 9, 1975, Ser. No. 577,250

Int. Cl.² G04C *3/04*

U.S. Cl. 58—23 AC **12 Claims**



1. In a timepiece having a gear train to drive the hands thereof, the combination comprising:

a high frequency reed fixedly mounted to the timepiece at one end and having a pair of spaced magnets mounted at the other end,

a low frequency reed fixedly coupled to the timpiece at one end and having a pair of spaced magnets mounted at the other end, each of said spaced magnets being located opposite a corresponding magnet of the high frequency reed,

a coil coupled to the timepiece and located symmetrically between the spaced magnets of the high frequency reed and the spaced magnets of the low frequency reed,

means connecting the low frequency reed to the gear train for the timepiece, and

drive means for activating the coil with current pulses which reverse polarity after a predetermined number of said current pulses and substantially at a point when the low frequency reed is at a predetermined maximum amplitude swing to interact with the pairs of spaced magnets thereby maintaining said low frequency reed in oscillation synchronized by said high frequency reed.

4,010,603
TIME MARKING CHRONOMETER

Eric B. Forsyth, Brookhaven, N.Y., assignor to Ensign Electronics, Inc., Brookhaven, N.Y.

Filed Apr. 30, 1975, Ser. No. 573,313

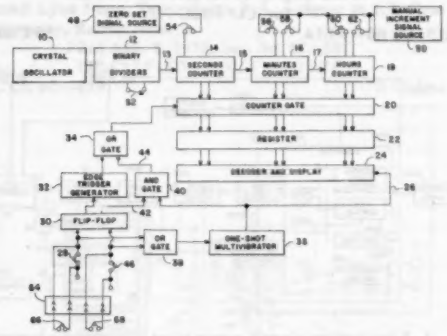
Int. Cl.² G04F *10/04*; **G04B** *19/00*

U.S. Cl. 58—39.5 **12 Claims**

1. An improved chronometer for measuring mean time with electronically operated digital displays comprising:

timekeeping section producing real time information in the form of hours, minutes and seconds;

gate means connected to said timekeeping section independently controlling the transfer of real time information from the timekeeping section to the digital displays whereby an individual real time reading may be retained upon the digital displays while the timekeeping operation continues uninterrupted with no loss of the reference to real time;



logic means connected to and controlling said gate means for inhibiting further transfer of time information to indicate the exact instant of real time at which a phenomenon takes place and including blocking means for preventing a subsequent attempt to retain a new time reading on the displays from superceding a first time reading; and

reset means connected to and controlling said logic means for reestablishing the transfer of time information to the displays after such transfer has been inhibited.

4,010,604
JOINTED LINK BAND

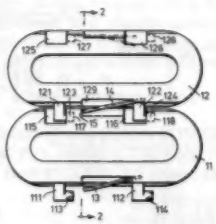
Bernhard Tesch, Im Baumgarten 4, Ennetbuergen, Switzerland

Filed Mar. 17, 1976, Ser. No. 667,829

Claims priority, application Germany, Mar. 18, 1975, 2511722

Int. Cl.² F16G *15/04*

U.S. Cl. 59—82 **6 Claims**

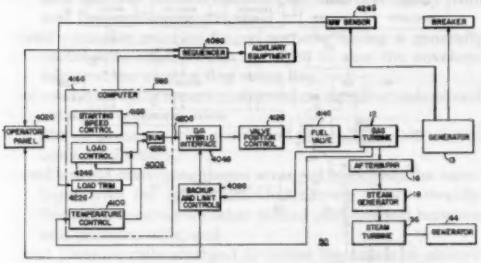


1. A jointed link band comprising a plurality of interconnected links, each link having a pair of spaced arms, a first arm of each link having a pair of extensions projecting transversely to the longitudinal axis of said hand, a second arm of each link having recess means for receiving said extensions thereby interconnecting said links to each other to form said band, and means for precluding disassembly of said extensions and recess means by relative motion therebetween in a direction transverse to said longitudinal axis.

4,010,605
ACCURATE, STABLE AND HIGHLY RESPONSIVE GAS TURBINE STARTUP SPEED CONTROL WITH FIXED TIME ACCELERATION ESPECIALLY USEFUL IN COMBINED CYCLE ELECTRIC POWER PLANTS

Robert Uram, East Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 8, 1974, Ser. No. 495,729
Int. Cl.² F02C 7/26
U.S. Cl. 60—39.14 **30 Claims**

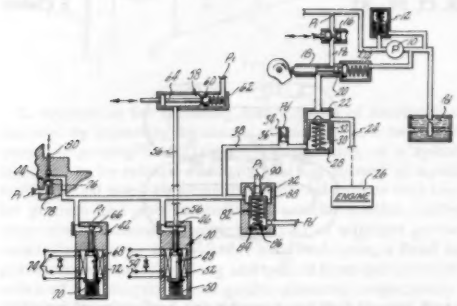


1. A gas turbine electric power plant comprising a compressor section and a turbine section, a plurality of combustors for energizing the driving gas flow for the turbine section, means for generating electric power under the driving power of the turbine, a gas turbine control system including means for controlling the flow of fuel to the turbine combustors, means for generating a representation of gas turbine speed, means for generating a gas turbine speed reference so that the reference increases from a first predetermined value substantially to the synchronous value normally in a substantially fixed period of time during turbine startup, means for generating a speed error output representing the difference between the speed reference and the actual turbine speed, and means for generating a fuel control signal in response at least to the integral of the speed error so that the actual turbine speed normally increases from the first speed value to the synchronous value in the fixed time period.

4,010,606
LATCHING VALVE SHUTOFF SYSTEM

Kenneth Peter Hansen, Enfield, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Feb. 2, 1976, Ser. No. 654,668
Int. Cl.² F02C 9/08
U.S. Cl. 60—39.28 R **7 Claims**



1. An improved fuel cutoff system for a gas turbine engine comprising:

means for supplying a flow of fuel to said engine at a first pressure;

a pilot-operated shutoff valve;

valve means movable between an open and a closed position disposed to interrupt said flow of fuel to said engine;

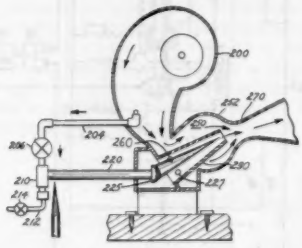
first means communicating said valve means to a first source of fluid for supplying fluid to said valve means during an abnormal engine operating condition at a second pressure sufficiently high to urge said valve means to the closed position;

second means actuated by said fluid for communicating said valve means to a second source of said fluid at a pressure at least as high as said second pressure for initially supplying said fluid to said valve means during said abnormal engine operating condition and continually supplying fluid to said valve means to maintain said valve means in the closed position until said engine is in a starting mode.

4,010,607
INTERNAL COMBUSTION ENGINE WITH AFTERBURNER, VENTURI COOLER AND EXHAUST TURBINE

Alvin S. Hopping, Nolan's Point, Lake Hopatcong, N.J. 07849

Filed Jan. 2, 1973, Ser. No. 320,435
The portion of the term of this patent subsequent to Jan. 8, 1992, has been disclaimed.
Int. Cl.² F02B 37/04; F01N 3/12
U.S. Cl. 60—274 **6 Claims**



1. A process which comprises burning hydrocarbon fuel in an internal combustion chamber to generate exhaust gases, burning additional fuel with excess compressed air in a secondary combustion chamber, commingling said exhaust gases in said secondary combustion chamber with said burning additional fuel and air under superatmospheric pressure, imparting spiral rotating circulation to the commingled gases in said secondary combustion chamber by directing said exhaust gases through a means tangentially disposed in said secondary combustion chamber and passing said commingled gases through a zone of reduced cross-sectional area, introducing cool air under superatmospheric pressure into said commingled gases in said zone, thereafter passing said mixture of gases and air through a zone of enlarged cross-sectional area further to cool the mixture, directing said cooled mixture into a turbine, discharging substantially completely oxidized gaseous effluent from said turbine, and coupling said turbine to an air compressor from which said air under superatmospheric pressure is derived.

4,010,608
SPLIT FAN WORK GAS TURBINE ENGINE

John Robert Simmons, Cincinnati, Ohio, assignor to General Electric Company, Lynn, Mass.

Filed June 16, 1975, Ser. No. 587,135
Int. Cl.² F02K 3/04
U.S. Cl. 60—226 R **3 Claims**

1. In a gas turbine engine having a compressor, combustor, high pressure turbine supplying rotational energy to the compressor and low pressure turbine in serial flow relation, all being circumscribed by an inner engine casing and an outer nacelle spaced apart from the inner engine casing to define a bypass duct therebetween, the outer nacelle extending upstream of the inner engine casing to define an inlet for the

engine and downstream of the inner engine casing to define an exhaust system for the engine, there is provided:

a front fan section disposed in the inlet upstream of the inner engine casing and receiving rotational energy from the low pressure turbine,

an aft fan section disposed intermediate the front fan section and compressor, receiving rotational energy from the high pressure turbine and circumscribed by an intermediate casing which is spaced radially inward from the outer

nacelle to define a bypass duct around the aft fan section, and

diverter valve means secured to the aft end of the intermediate casing for selectively distributing the flow compressed by the front fan section between the aft fan section and the bypass duct around the aft fan section and simultaneously therewith selectively distributing the flow compressed by the aft section between the compressor and bypass duct around the compressor.

4,010,609

JACK-PUMP DEVICE

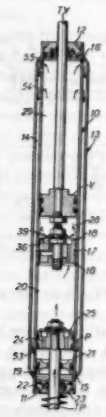
Marcel Boutroy, Amblainville, and Jacques Neyret, Gennevilliers, both of France, assignors to Hydrelem SA, Lausanne, Switzerland

Filed Feb. 24, 1976, Ser. No. 660,794

Claims priority, application France, Feb. 25, 1975, 75.05745; Feb. 16, 1976, 76.04124

Int. Cl.² F15B *13/09*

U.S. Cl. 60—402 **17 Claims**



1. A jack-pump device comprising a pump having a sliding piston defining on each side of itself a first and a second chamber respectively, a jack having a sliding piston defining on each side of itself a first and a second chamber respectively, a first valve means between the pump chambers, this first valve means being unidirectional in the direction going from the second to the first pump chamber, a second valve means between the first chambers of the pump and the jack, and communication means between the two second chambers of the pump and the jack, the two pistons being axially in line and mounted slidably in the same cylinder body filled with fluid, a fixed transverse partition being arranged in said cylinder body between the two pistons, said device further comprising a plunger for compensating variations of volume, said plunger being mounted slidably in one of the two second chambers in the vicinity of the corresponding extremity of said cylinder body.

4,010,610

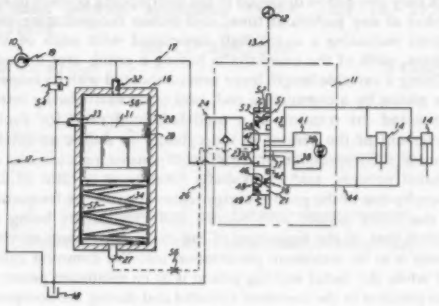
HYDRAULIC LOAD-SENSING SYSTEM

Donnell Lynn Dunn, Terre Haute, Ind., assignor to J. I. Case Company, Racine, Wis.

Filed Apr. 9, 1976, Ser. No. 675,587

Int. Cl.² F16D *31/00*; F15B *15/18*

U.S. Cl. 60—459 **8 Claims**



1. A hydraulic load-sensing system, comprising a pump, a valve having fluid passageways extending therethrough and with a fluid inlet and a fluid outlet at opposite ends of one of said passageways, a hydraulic load actuator member, hydraulic lines interconnecting all the aforesaid into the system and with said pump being hydraulically connected with said valve inlet and with said load actuator member being hydraulically connected with said valve outlet, said valve having a hydraulic sensing port hydraulically connected with said valve outlet for sensing hydraulic pressure at said valve outlet, a hydraulic pressure compensator having a valve member and two hydraulic chambers on operatively opposite sides of said valve member and with said chambers being respectively hydraulically connected to the outlet of said pump and to said sensing port to have the respective hydraulic pressures applied to said valve member, a biasing member included in said compensator and operative on said valve member urging same thereon in the direction of hydraulic force created thereon from the fluid related to said sensing port, said compensator having a hydraulic outlet in fluid-flow communication with the one of said chambers connected with said pump, said valve member being disposed and operable for controlling fluid flow through said compensator outlet and thereby control the hydraulic pressure in said one chamber in accordance with the hydraulic pressure drop across said valve from said valve inlet to said valve outlet.

4,010,611

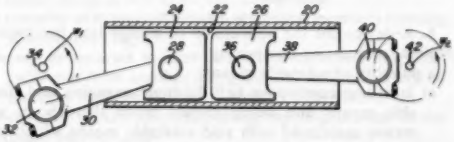
COMPRESSION-EXPANSION POWER DEVICE

James E. Zachery, P.O. Box 116, Corrales, N. Mex. 87048

Filed Dec. 17, 1974, Ser. No. 533,539

Int. Cl.² F01B *7/02*

U.S. Cl. 60—516 **5 Claims**



1. A compression-expansion power device comprising a

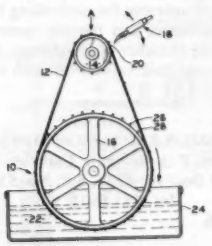
chamber of predetermined volume defined by an enclosing structure adapted to receive and exhaust a compressible fluid, said structure including opposed portions movable relative to each other and occupying common spaces over the entire space of the chamber at predetermined, non-simultaneous intervals thereby enabling predetermined changes in the volume of the chamber between the opposed portions at different relative positions thereof, said commonly occupied space in the chamber constituting a substantial portion of the volume defined by the enclosing structure, said chamber being defined by an open-ended cylinder and the opposed portions include a pair of pistions reciprocally disposed in said cylinder, and means reciprocating said pistons whereby a substantial portion of the inner portions of the piston strokes overlap with only one piston disposed in the overlapping portion of the strokes at any particular time, said means reciprocating said pistons including a crankshaft associated with each of the pistons, each of the crankshafts having a crank arm thereon defining a variable length lever arm connected with its respective piston by a connecting rod, said crankshafts being interconnected for rotation at a predetermined ratio for cyclic movement of the pistons in the cylinder to define an intake process, a compression process, an expansion process and an exhaust process, said crankshafts rotating at a ratio of 2:1 whereby one of the pistons reciprocates at twice the frequency of the other piston, said pistons and crankshafts being so phased that, at the beginning of the cycle, the slower moving piston is at its maximum penetration into the common cylinder while the faster moving piston is at its minimum penetration position in the common cylinder and during the compression process, the slower moving piston and crankshaft move from 0° to 80° while the faster moving piston and crankshaft moves from 0° to 160°, during the expansion process, the slower moving piston and crankshaft moves from 80° to 180° while the faster moving piston and crankshaft moves from 160° to 360°, during the exhaust process, the slower moving piston and crankshaft moves from 180° to 280° while the faster moving piston and crankshaft moves from 360° to 560° and during the intake process, the slower moving piston and crankshaft moves from 280° to 360° while the faster moving piston and crankshaft moves from 560° to 720° thus completing the cycle, such arrangement being the nominal operation and phasing of the device.

4,010,612

THERMAL MOTOR

Dante J. Sandoval, Cleveland, Ohio, assignor to Dante J. Sandoval, Cleveland, Ohio

Filed Dec. 13, 1974, Ser. No. 527,254
Int. Cl.² F03G 7/06
U.S. Cl. 60—527 **12 Claims**



1. A device for the conversion of energy into mechanical motion, said device comprising:

a plurality of rotatable means;

at least one continuous belt drivingly engaging said rotatable means and being closely fitted thereabout, and means associated with said rotatable means which preclude slippage of said belt thereabout, said belt comprising transducer means adapted to alter its configuration to a relatively rigid preset configuration upon the application of heat and

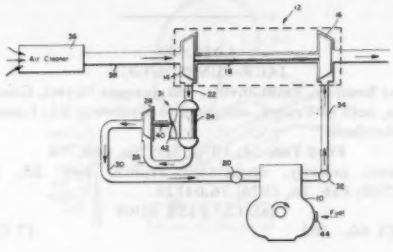
means of selectively applying said heat to said belt, whereby said belt configuration alteration causes said rotatable elements to rotate.

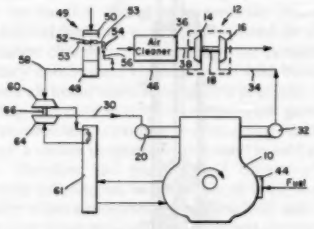
4,010,613

TURBOCHARGED ENGINE AFTER COOLING SYSTEM AND METHOD

Charles E. McInerney, Torrance, Calif., assignor to The Garrett Corporation, Los Angeles, Calif.

Division of Ser. No. 422,108, Dec. 6, 1973, abandoned. This application June 2, 1975, Ser. No. 583,130
Int. Cl.² F02B 29/04
U.S. Cl. 60—599 **5 Claims**





1. A turbocharging system for an internal combustion engine comprising:

a turbocharger having a turbine driven by hot exhaust gases from said engine and a compressor on a common shaft with said turbine to compress charge air for said engine;

heat exchanger means to receive compressed charge air from said turbocharger compressor to remove heat from the charge air;

turbine fan means operably associated with said heat exchanger means to push a flow of ambient air across said heat exchanger means, said turbine fan means driven by a portion of the compressed charge air from said turbocharger compressor;

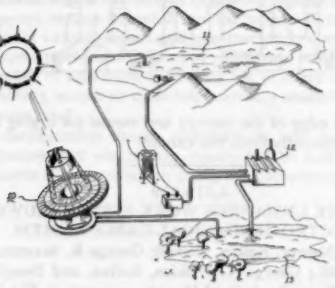
compressor means to receive charge air from said heat exchanger means to further compress the charge air; and

turbine means to receive compressed charge air from said compressor means to expand the charge air to a temperature below ambient temperature and to deliver the cooled compressed charge air to said engine, said turbine means on a common shaft with said compressor means to drive said compressor means.

4,010,614
SOLAR RADIATION COLLECTOR AND SYSTEM FOR CONVERTING AND STORING COLLECTED SOLAR ENERGY

David M. Arthur, 4020 N. 14th. Ave., Phoenix, Ariz. 85013

Filed Nov. 13, 1974, Ser. No. 523,262
Int. Cl.² F03Q 7/02
U.S. Cl. 60—641 4 Claims



1. Apparatus for converting and storing solar energy comprising, in combination:

a. collector means for collecting and reflecting incident solar radiation, said collector means including

1. a generally circular framework having a planar configuration;

2. a plurality of concentric annuli, each annulus having a plurality of modules, wherein each of said modules includes

a shape substantially identical to that of every other module comprising said annulus,

a generally planar rear surface,

a reflective front surface having a concave shape with a point of focus,

b. concentrator means for concentrating the reflected solar radiation, said concentrator means including

1. a reflector located between said collector means and the solar radiation source for directing said solar radiation on a concentrated area, said reflector having a convex surface facing said collector means;

2. a support for positioning said reflector in axial alignment with said collector means;

3. a focuser for selectively moving said reflector along the axis of said collector means thereby selectively determining the location of the concentrated area on which said solar radiation is directed; and

4. tracking means for maximizing the exposure of said collector means to normal incident solar radiation;

c. converter and storage means for converting the concentrated solar radiation into electrical energy and potential energy and for storing the potential energy, said converter and storage means including

1. a low elevation reservoir for retaining water,

2. a high elevation reservoir for retaining water and for collecting surface water,

3. a boiler positioned at the axis of said collector means for converting water into steam,

4. a turbine powered by steam from said boiler,

5. a condenser for converting steam leaving said turbine into water and for returning said converted water to said boiler,

6. a generator powered by said turbine for producing electrical energy, and

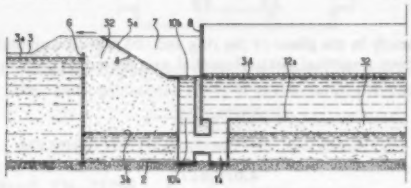
7. a pump powered by said turbine for producing and storing potential energy by transferring water from said low elevation reservoir to said high elevation reservoir; and

d. auxiliary conversion means for converting the stored potential energy into electrical energy, said auxiliary conversion means including a hydroelectric generator powered by water from said high elevation reservoir.

4,010,615
PARTIALLY BURIED TANKS FOR THE STORAGE OF PETROLEUM PRODUCTS

Nestor Leon Pladys, Dunkerque, France, assignor to Societe Francaise des Petroles BP and Soletanche, both of, France

Filed June 16, 1975, Ser. No. 586,923
Claims priority, application France, June 18, 1974, 74.21158
Int. Cl.² B65G 5/00
U.S. Cl. 61—.5 3 Claims



1. A partially buried facility for storing petroleum products, comprising:

a peripheral equalization basin for containing water, and having a truncated cone-shaped external slope, said basin being rendered liquid-tight by an appropriate covering;

a liquid-tight enclosure of at least partially dry terrain surrounding said basin, said enclosure being supported on a layer of impermeable or artificially impermeabilized terrain;

a storage tank located centrally within the confines of said enclosure, said tank comprising a cylindrical wall and, at a level above that of the bottom of said enclosure, a flat bottom covered with an isolating liquid-tight lining;

at least one lateral equalizing wall interrupting the bottom of said tank at the periphery, said equalizing well penetrating slightly into the layer of impermeable or artificially impermeabilized terrain supporting said liquid-tight enclosure; and

a liquid-tight pipe connecting said equalizing well with said peripheral equalization basin, said pipe traversing the layer of dried terrain as well as the phreatic water level of said-liquid tight enclosure.

4,010,616
RIB EXPANDER

Richard Lovat, 42 Grovetree Ave., Rexdale, Canada

Filed Sept. 23, 1975, Ser. No. 615,899
Int. Cl.² E21D 11/12
U.S. Cl. 61—45 R 9 Claims

1. A rib expander, for use with tunnelling apparatus where the tunnel being driven is curved, comprising:

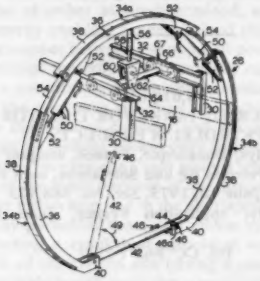
a plurality of elongated arcuate segmental members forming a sectioned ring;

means to separate at least two of the members longitudinally one from another along the circumferential axis of the ring whereby the ring is radially expandable;

means for horizontally translating the ring normal to the plane thereof; and

means carried by the horizontal translating means to support the ring in a vertical plane thereon, said support

means being constructed and arranged whereby the ring is (a) movable on the horizontal translating means transversely in the plane of the ring and (b) movable pivotally about a vertical circumferential axis thereof.



4,010,617

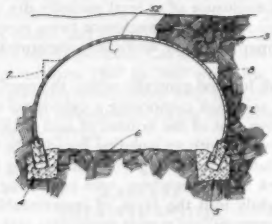
COMPOSITE ARCH STRUCTURE

Christopher L. Fisher, Winnipeg, Canada, assignor to Armco Steel Corporation, Middletown, Ohio

Filed May 19, 1975, Ser. No. 578,605

Int. Cl.² F16L *9/22*; E01G *5/06*; E21D *9/00*

U.S. Cl. 61—45 R **23 Claims**



1. In a composite arch structure of the type comprising a liner with compacted fill material thereagainst and thereabout to form a soil arch thereabout, a foundation for said liner comprising yieldable footer means, and means to control the amount and rate of yielding of said footer means whereby said liner will settle at a rate at least equal to the rate of settling of said fill material thereabout.

4,010,618

MINE ROOF SUPPORT

John Hirst Walker, Cheltenham, England, and Alan Peacock, Pittsburgh, Pa., assignors to Dowty Mining Equipment Limited, England

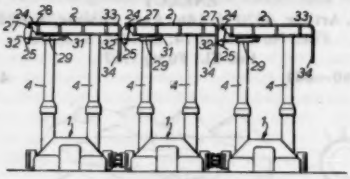
Continuation-in-part of Ser. No. 542,427, Jan. 20, 1975, abandoned. This application Sept. 2, 1975, Ser. No. 609,821

Claims priority, application United Kingdom, Jan. 19, 1974, 2628/74

Int. Cl.² E21D *17/10*

U.S. Cl. 61—45 D **23 Claims**

1. A mine roof support comprising a floor beam, a canopy having a pair of parallel opposed edges extending in the advancing direction of the support, a plurality of extendible struts acting between the floor beam and the canopy, one or more pivoted flaps extending along one said edge of the canopy whose pivotal axis or axes is or are substantially parallel to the said one edge of the canopy and means for urging the or each flap outwardly from the canopy.



4,010,619

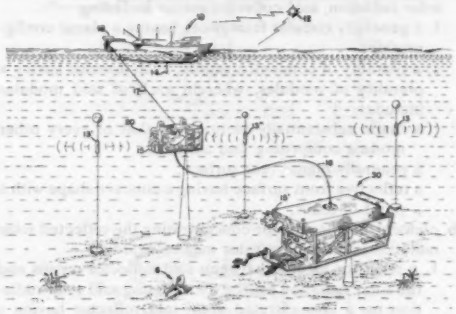
REMOTE UNMANNED WORK SYSTEM (RUWS) ELECTROMECHANICAL CABLE SYSTEM

John D. Hightower, Kailua, Hawaii; George R. Beaman, Leucadia, Calif.; George A. Wilkins, Kailua, and Douglas W. Murphy, Kaneohe, both of Hawaii, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 24, 1976, Ser. No. 689,306

Int. Cl.² B63C *11/34*

U.S. Cl. 61—69 R **27 Claims**



1. A remotely controlled underwater work system comprising:

a surface control station;

a primary cable operatively connected to said surface control station at its upper end and extending vertically downward therefrom and configured to provide mechanical support to loads attached thereto and to provide electrical energy transfer therealong;

primary cable terminating means connected to said primary cable for underwater support thereby and including,

attachment means mounted on the lower surface of the primary cable terminating means for releasable support of loads attached thereto,

controllably powered reel means mounted on said primary cable terminating means for paying out and recovering a secondary cable,

a secondary cable wound on said controllably powered reel means,

hydrodynamic thrusting means mounted on said primary cable terminating means in fixed relation thereto for providing stabilization and limited spatial positioning thereof, and

electrical signal distribution means mounted on said primary cable terminating means and electrically connected to said primary cable for receipt of electrical energy therefrom and effectively electrically connected to said controllably powered reel means, said secondary cable, and said hydrodynamic thrusting means for apportioning the electrical energy thereto; and

work vehicle means attached to said secondary cable for providing a work station and including,

propulsion means mounted on said work vehicle for moving said work vehicle in a predetermined area and electrically connected to said secondary cable for receipt of electrical energy therefrom,

mechanical manipulator means mounted on said work vehicle and effectively connected to said secondary cable means for receipt of control signals therefrom,

support means mounted on the upper surface of said work vehicle means and constructed to cooperate with said attachment means for permitting selective attachment of said work vehicle to the primary cable terminating means to establish a unitary assemblage therewith, and

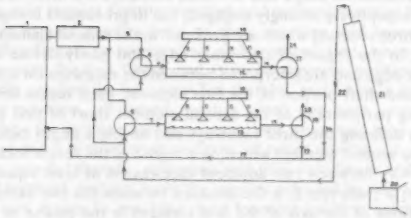
communication means mounted on said work vehicle means and electrically connected to said secondary cable for transmission of signals therethrough.

4,010,620

COOLING SYSTEM

Maria Telkes, Newark, Del., assignor to The University of Delaware, Newark, Del.

Filed Oct. 8, 1975, Ser. No. 620,570
Int. Cl.² F25B 27/00
U.S. Cl. 62—2 **6 Claims**



1. The method for air conditioning buildings which comprises dissolving in water a salt having an endothermic heat of solution, to create a cold solution, passing air in heat exchange relationship with said cold solution to cool the air for introduction into said building, recovering the salt for reuse by evaporation of the water from the solution with hot air, the heating of the air being at least partly provided by solar heat.

4,010,621

STIRLING CYCLE HEAT PUMP

Karlheinz Raetz, No. 12, Gassnerstrasse, 33 Braunschweig, Germany

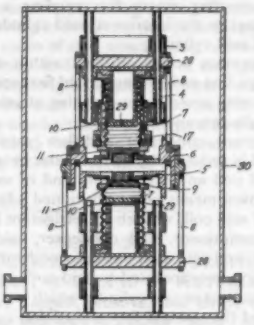
Filed Dec. 30, 1974, Ser. No. 537,530
Claims priority, application Germany, Jan. 4, 1974, 2400256; Nov. 8, 1974, 2452986
Int. Cl.² F25B 9/00
U.S. Cl. 62—6 **12 Claims**

1. A heat pump which is operationally based on the Stirling cycle and which comprises:

a. a heat regenerator,

b. two heat exchangers for circulating a heat transferring liquid and disposed adjacent to opposite sides respectively of and communicating with said regenerator,

c. two pumping chambers, each formed of a flexible metal bellows and disposed adjacent to and communicating with one of said heat exchangers, and



d. means for driving said bellows to simultaneously expand one, and contract the other of said bellows alternately.

4,010,622

METHOD OF TRANSPORTING NATURAL GAS

Berwyn E. Etter, 368 Boca Ciega Point Blvd. South, Madeira Beach, Fla. 33708

Filed June 18, 1975, Ser. No. 587,830
Int. Cl.² F17C 7/02
U.S. Cl. 62—48 **8 Claims**

1. A method of transporting natural gas which eliminates the need for ultra low temperature refrigeration units, said method comprising,

saturating natural gas at its source with an organic additive which is normally liquid at ambient conditions and is selected from the group consisting of C_5 to C_{20} hydrocarbons, alcohols and esters, and mixtures thereof, which when combusted yield only carbon and hydrogen containing products, to provide a mixture which liquefies at substantially higher temperatures than natural gas alone,

liquefying all of said mixture for fuel transport,

transporting said liquefied mixture to its destination for end useage,

vaporizing said mixture, and

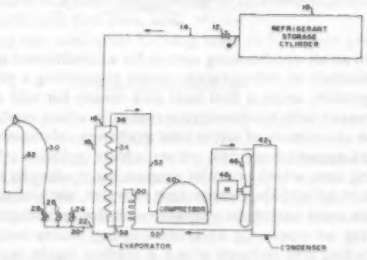
adding sufficient air to said mixture prior to combustion to provide a fuel of normal Btu capacity.

4,010,623

REFRIGERANT TRANSFER SYSTEM

Anthony A. Kaschak, Rte. 5, Box 128-C, Scottsboro, Ala. 35768

Filed Apr. 12, 1976, Ser. No. 676,319
Int. Cl.² F17C 7/02
U.S. Cl. 62—55 **3 Claims**



1. In a system for transferring refrigerant from a large storage container to a smaller service container, the combination comprising:

an elongated cylinder;

first coupling means for coupling a large, storage, refrigerant container to the interior of said cylinder at a first end of said cylinder;

second coupling means for coupling a smaller, service, container to the interior of said cylinder at the opposite end of said cylinder;

an evaporation coil positioned within said cylinder and having a first end exiting at said first end of said cylinder, and having a second end exiting at said opposite end of said cylinder; and

a compressor, condenser, and flow restriction means connected in series in the named order between said first end of said coil and said second end of said coil, said flow restriction means being positioned adjacent said second end of said coil, whereby a refrigerant loop is defined by said compressor, said condenser, said flow restriction means, and said coil, and a second refrigerant placed in said loop is evaporated in said coil, creating a temperature gradient in said cylinder which is cooler at said opposite end than at said first end of said cylinder, whereby a pressure gradient is created in said cylinder around said coil in which said pressure is greater at the first end of said cylinder than at the opposite end, causing refrigerant from the large storage container to flow into the smaller service container.

4,010,624

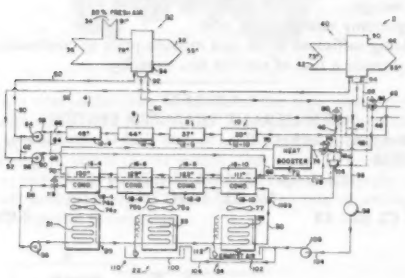
AIR CONDITIONING SYSTEM

Alden Irving McFarlan, 691 Dorian Road, Westfield, N.J.

Division of Ser. No. 436,355, Jan. 24, 1974, Pat. No. 3,850,007, which is a continuation of Ser. No. 260,211, June 6, 1972, abandoned. This application Nov. 25, 1974, Ser. No. 526,815

Int. Cl.² F25B *29/00*

U.S. Cl. 62—159 **11 Claims**



1. In an air conditioning system for a conditioned space, the combination of, refrigeration means comprising a plurality of refrigeration units, a first heat sink means for said refrigeration means with air-circulation means to effect cooling solely by the circulation of air in heat exchange relationship therewith, a second heat sink means which includes a heat sink cooling zone which provides evaporative cooling by the circulation of air and the evaporation of water, each of said refrigeration units having an evaporator-chiller and other elements forming an operating unit, air cooling means including an air-cooling coil through which a cooling liquid may flow to said conditioned space to cool and dehumidity air and thereby produce condensate, means to circulate a cooling liquid in series through said evaporator-chillers and thence through said air-cooling coil, and means to supply said condensate to said heat-sink cooling zone of said second heat sink means.

4,010,625

SLIDING HOMOKINETIC JOINT

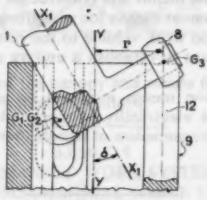
Michel Orain, Conflans Sainte Honorine, France, assignor to Glaenzer Spicer, Poissy, France

Filed Sept. 11, 1975, Ser. No. 612,566

Claims priority, application France, Sept. 27, 1974, 74.32689

Int. Cl.² F16D *3/30*

U.S. Cl. 64—21 **5 Claims**



1. In a sliding homokinetic joint comprising a first element rotatable about an axis and integral with one of two shafts to be coupled and having a shaft portion and three trunnions extending from the shaft portion, three rollers respectively rotatably mounted on the trunnions and a second element which is rotatable about an axis and is integral with the other of said shafts to be coupled and has the general shape of a cylindrical ring having an end portion which is remote from said other shaft and defines a radially inner edge and having portions which define three raceways which have a particular cross-sectional shape and in which raceways the three rollers are respectively rollingly engaged; the improvement comprising three recesses which are provided in the second element at least in the region of said inner edge and partly define said inner edge and are interposed between the raceways for clearing said shaft portion of the first element, each recess terminating peripherally of the second element short of said portions defining the three raceways and having a depth radially of the second element which, in a region of the recess located half-way between two adjacent raceways is at least equal to $E/\cos \sigma$, wherein E is the distance between the two extreme positions of the axis of the first element in the course of the planetary motion of the first element in joint operation and σ is the maximum break angle of the joint.

4,010,626

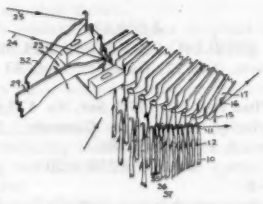
HOSIERY MACHINE WITH TERRY FORMING APPARATUS

Tibor Feher, 5130 Bourret Ave., Apt. 9, Montreal 252, Quebec, Canada

Filed Feb. 6, 1973, Ser. No. 330,029

Int. Cl.² D04B *35/00, 9/12*

U.S. Cl. 66—93 **5 Claims**



1. In a circular knitting machine for producing plain and terry knitted fabric, a rotatable needle cylinder having a top edge, knitting needles movable up and down in said cylinder, a rotatable dial coaxial with said needle cylinder, vertically adjustable relative to said cylinder and disposed above the

latter, said dial having a series of radial slots extending to the outer edge of said dial, a series of loop forming elements located in the slots, a vertically adjustable stationary dial cap defining a cam race engaged by said loop forming elements for radially moving the same at right angles to said needles between a retracted position inwardly of said dial outer edge and inwardly of said needles and an advanced position extending beyond said dial outer edge and beyond said needles, said loop forming elements disposed in a plane above said needle cylinder top edge and each having a hook formed by an upwardly inclined tip capable of retaining a yarn loop thereon and of allowing release of said loop by engagement with the dial outer edge upon retracting movement of said loop forming element within said dial, a stationary throat plate having a radially inner edge disposed outwardly of and close to said needles and located just above the loop forming elements, said throat plate having a slot made therethrough radially inwardly extending and opening at said inner edge of said throat plate, a pair of yarn feeding fingers pivoted about a horizontal stationary axis and each having a yarn carrying and feeding end vertically movable above said throat plate, one of said fingers being a loop yarn feeding finger and pivotable with its feeding end moving between a topmost position well above said throat plate and a lowermost position just above said throat plate, the other of said fingers being a base yarn feeding finger pivotable in a plane in vertical alignment with said throat plate slot with its feeding end moving between a topmost position well above said throat plate and a lowermost position extending through said throat plate slot to feed yarn below said throat plate, the needles between loop forming elements raisable to a regular knitting position above the level of said throat plate, and a variable number of said last-named needles raisable to a topmost position at a higher level than said regular knitting position, said regular knitting position and topmost position being taken by said needles prior to their reaching said base yarn feeding finger, so constructed and arranged that, when said base yarn feeding finger end is in its topmost position, no needle catches the base yarn fed thereby, and when in lowermost position, all raised needles catch the base yarn fed thereby for knitting said base yarn, and when said loop yarn finger end is in lowermost position, all raised needles catch the loop yarn fed thereby, and when said loop yarn finger end is in said topmost position, only the needles selected by said selector cam means in reaching their topmost position catch the loop yarn fed from said loop yarn finger, the loop yarn knitted by said needles being caught by the advanced loop forming elements and released upon retraction of said loop forming elements.

4,010,627

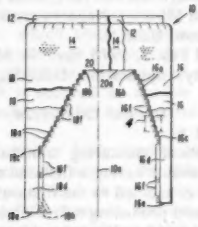
KNIT GARMENT, KNIT BLANK THEREFOR AND METHOD OF MAKING SAME

David Pernick, 1020 Shore Blvd., Brooklyn, N.Y. 11235

Filed Jan. 19, 1976, Ser. No. 650,443

Int. Cl.² A41B *9/02, 9/04, 9/10*

U.S. Cl. 66—177 **9 Claims**



1. A knitted garment blank having a seamless knitted tubular body portion of predetermined length, said body portion having wales and courses formed of suitable yarn and having a terminal course, and spaced seamless knitted non-tubular first and second panels of predetermined length interknitted with and extending from correspondingly spaced portions of said terminal course and also having wales and courses formed of suitable yarn, said panels having non-joined separate terminal portions, the wales of said panels being common to wales of said body portion and the courses of said panels being formed of individual lengths of yarn, said panels having non-selvage edges at the ends of the courses thereof, said edges having fringe-like non-knitted floats of yarn extending therefrom, such floats being formed of end portions of said lengths of yarn extending from the terminal stitches of the courses knit therefrom.

4,010,628

METHOD AND DEVICE OF MAKING A PROFILED BODY OF AT LEAST ONE BAND OF MATERIALS

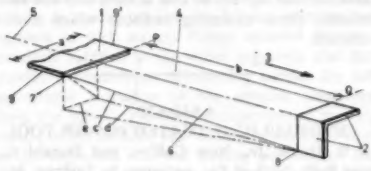
Raimund Falkner, Roppen, Austria, and Heinz Grune, Solingen, Germany, assignors to Rapena Patent - und Verwaltungs-AG, Stadtle, Liechtenstein

Filed Jan. 17, 1975, Ser. No. 542,020

Claims priority, application Switzerland, Jan. 22, 1974, 810/74; Feb. 13, 1974, 2026/74

Int. Cl.² B21D *5/08*

U.S. Cl. 72—181 **3 Claims**



1. A method of making a profiled body from a band of material having two exterior edges, comprising the steps of

introducing initial undulations into parts of said band to facilitate profiling of the band during subsequent forming steps,

determining at least one directrix on the band, said directrix coinciding with a prominent longitudinal edge of the body to be formed, and said directrix dividing the band into first and second band areas, the first band area extending from one exterior edge of the band to said directrix, and the second area extending from the other exterior edge of the band to said directrix,

evening out and minimizing the tensile stresses in said exterior edges and reducing the number of rolls necessary for further forming operation on said band by swinging said first area about said directrix in a first direction and simultaneously swinging said second area about said directrix in a direction opposite to said first direction and towards said first area, and

carrying out additional forming steps to form said profiled body.

4,010,629

ROD SPLICE

Richard J. Wolicki, Buffalo, N.Y., assignor to Buffalo Brake Beam Company, Lackawanna, N.Y.

Division of Ser. No. 565,521, April 7, 1975, Pat. No. 3,969,032. This application Dec. 11, 1975, Ser. No. 639,651

Int. Cl.³ B21D *53/36*

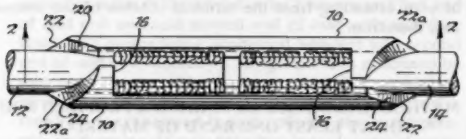
U.S. Cl. 72—368 **1 Claim**

1. The method of making a body member for a rod repair splice means for repairing a rod to be spliced, said method comprising:

the step of providing a planar blank having in plan view form opposite side edge portions, and opposite end por-

tions wherein at least one of said end portions includes a pair of end edges extending from respectively adjacent side edges towards one another to a point of intersection with said end edges being substantially perpendicular to the plane of said plan view,

the step of forming said blank partially about a cylindrical surface along a longitudinal axis passing through said end portions and thereby forming an axial end face at said point of intersection and first and second camming surfaces extending between said axial end face and said



respectively adjacent side edge portions, said first and second camming surfaces longitudinally receding and extending from the radially outer surface of said formed blank to the inner radial surface thereof, and

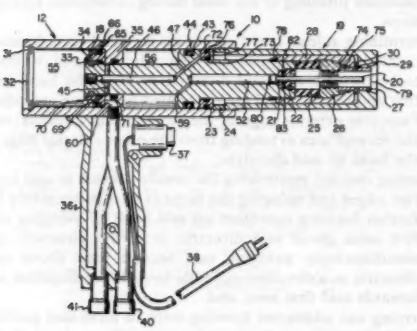
the step of shaping said axial end face to provide a third camming surface intersecting and disposed between said first and second camming surfaces and extending from the outer radial surface of said formed blank to the inner radial surface thereof so that at least said one end portion includes three camming surfaces which cam radially outward.

4,010,630

HYDRAULIC ACTUATED POWER TOOL

Samuel B. Davis, Jr., New Galilee, and Donald G. Lordo, Beaver Falls, both of Pa., assignors to Textron, Inc., Providence, R.I.

Filed Apr. 8, 1976, Ser. No. 674,967
Int. Cl.² B21J *15/34*
U.S. Cl. 72—391 **8 Claims**



1. A hydraulic actuated tool comprising:

A. a barrel having an internal, annular bulkhead separating the barrel into a front cylinder and a rear cylinder, said bulkhead including a first port directed into the front cylinder and a second port directed into the rear cylinder;

B. a handle depending from the barrel in the area of the bulkhead;

C. a piston shaft positioned in the barrel and having a first piston integrally formed intermediate the piston shaft ends to form a first piston rod positioned with the first piston in the front cylinder and a second piston rod extending through the bulkhead into the rear cylinder, said second piston rod having a transverse port extending therethrough and a longitudinal port connecting midway of the transverse port and extending along the second piston rod and terminating in a bifurcated passageway, each leg of the passageway extending angularly outward from the longitudinal port and clear through the first piston;

D. a second piston mounted at the distal end of said second piston rod, said piston forming the end wall of the rear cylinder;

E. front wall means positioned within the barrel to define the end wall of the first cylinder;

F. a fastener driving assembly secured to the barrel including means associated with the first piston rod to grip a fastener;

G. a first and second pipe extending through the handle, said first pipe connected to the first port and said second pipe connected to the second port;

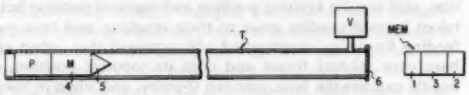
whereby a first activation of the tool transmits oil through the second port and against the second piston and simultaneously therewith through the transverse and longitudinal ports against the front wall means to simultaneously force the two pistons rearward and a second activation transmits oil through the first port and against the first piston, said oil in the first and second chambers exiting through the second pipe.

4,010,631

METHOD AND APPARATUS FOR PULSE SHAPING IN BALLISTIC SIMULATORS

Irvin Pollin, Bethesda, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 9, 1975, Ser. No. 611,776
Int. Cl.² G01M *7/00*
U.S. Cl. 73—12 **6 Claims**



1. A ballistic simulation system for projectiles including:

an accelerator for said projectiles;

a momemtum-exchange member including a resilient component positioned in the path of travel of said projectiles; and

a crushable mitigator mounted on one of said porjectiles and said momemtum-exchange member and positioned to be crushed therebetween, said mitigator including a cylindrical body and a non-cylindrical crush zone, said crush zone varying in cross-sectional area along its length and including plural areas for engagement by the other of said projectiles and said momentum-exchange member

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4,010,632

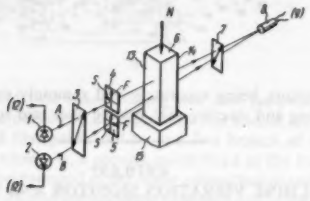
PIEZOOPTICAL MEASURING TRANSDUCER

Isaak Isaevich Slezinger, ulitsa Kirova, 40-a, kv. 41; Georgy Mironovich Belitsky, Pervomaiskaya ulitsa 74, kv. 101; Vladimir Alexandrovich Shiryaev, ulitsa Iskra 7, kv. 34, and Jury Vasilievich Mironov, Nagornaya ulitsa, 68 kor. 14, kv. 34, all of Moscow, U.S.S.R.

Filed Feb. 3, 1976, Ser. No. 654,733
Claims priority, application U.S.S.R., Feb. 12, 1975, 2105757
Int. Cl.² G01L *1/24*
U.S. Cl. 73—141 A **3 Claims**

1. A piezooptical measuring transducer comprising: a square-pulse generator having a first and a second outputs; a first light source connected to the first output of said square-pulse generator and producing a first luminous flux; a second light source connected to the second output of said square-pulse generator and producing a second luminous flux; a polarizer placed immediately after the first and second light sources across said luminous fluxes passing therethrough; an elastic element sensitive to variations of mechanical stresses

therein caused by changes in the measurand and having two transparent parallel faces; said elastic element being placed downstream of said polarizer across said first and second luminous fluxes passing through said faces; an analyzer placed downstream of said elastic element across said first and second luminous fluxes passing therethrough; a first phase-shifting plate arranged between said polarizer and analyzer, only said first luminous flux passing therethrough; a second phase-shifting plate also arranged between said polarizer and analyzer and oriented in relation to the first phase-shifting plate so that its axis of maximum velocity of light propagation is perpendicular to that of the first phaseshifting plate, only said second luminous flux passing therethrough; a photocell placed



downstream of said analyzer across said first and second luminous fluxes, said first and second luminous fluxes being incident thereupon; said first and second light sources being connected to said first and second outputs of said square-pulse generator so that said photocell receives alternately either first luminous flux having passed through said polarizer, first phase-shifting plate, elastic element, and analyzer, or the second luminous flux having passed through said polarizer, second phase-shifting plate, elastic element, and analyzer; said photocell converting said first and second luminous fluxes incident thereupon into an electric signal; a recorder coupled to said photocell and receiving said electric signal, its readings being representative of the measurand.

4,010,633

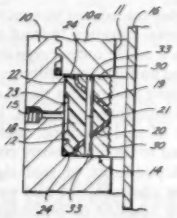
ANNULAR SEAL

Malvern M. Hasha, 1527 Castlerock, Houston, Tex. 77090

Filed Nov. 17, 1975, Ser. No. 632,790

Int. Cl.² G01M 3/04

U.S. Cl. 73—46 **2 Claims**



1. In a testing apparatus for externally testing a portion of a tubular member, which testing apparatus has an opening longitudinally therethrough for receiving the tubular member and which testing apparatus has at least one annular groove therein in which is secured an annular seal for externally engaging the tubular member, an improved annular seal comprising:

an annular elastomer body having an inner surface for extending generally toward the tubular member to be sealingly engaged and an outer circumferential surface for receiving fluid pressure, said inner surface including two opposing sloping surfaces which taper inwardly to an interfacing surface which physically engages the tubular member when the elastomer body is moved radially inwardly, said annular elastomer body being capable of moving radially inwardly toward the tubular member responsive to a selected fluid pressure being supplied to its outer circumferential surface and of moving radially outwardly from the tubular member to substantially its original position when the selected fluid pressure is no longer supplied to the outer circumferential surface;

a plurality of tapered segments associated with the inner surface of the annular elastomer body at selected spaced arcuate positions, each of such segments having a first arcuate surface for extending toward the tubular member to be sealingly engaged and having a second surface of preselected shape for extending toward and communicating with a corresponding one of the sloping surfaces of the inner surface of the annular elastomer body, each of such segments being positioned with respect to the elastomer body such that an annular space exists between the inner surface of the elastomer body and the second surface of the segment;

at least some of the segments including an arcuate flange secured to a portion of the second surface of the segment between the second surface of the segment and the first surface of the elastomer body, said arcuate flange extending beyond the segment to which it is secured and into the annular space between the inner surface of the elastomer body and the second surface of an adjacent segment;

whereby when the elastomer body moves radially inwardly toward the tubular member responsive to the selected fluid pressure being supplied to its outer circumferential surface, the segments and the flanges are likewise moved radially inwardly toward the tubular member and each segment as well as any flange secured thereto moves annularly relative to the other segments and flanges to provide a continuous reinforcing barrier for inhibiting undesirable extrusion of the annular elastomer body along the tubular member irrespective of the degree of closure of the annular seal and the co-acting first surfaces on the segments and the sloping portions of the inner surface on the elastomer body are disposed to apply force to the segments and urge the first surfaces of the segments into tighter frictional engagement with the tubular member upon continued application of pressure to the outer circumferential surface of the elastomer body after the interfacing surface of the elastomer body has engaged the tubular member.

4,010,634

ULTRASONIC INSPECTION METHOD

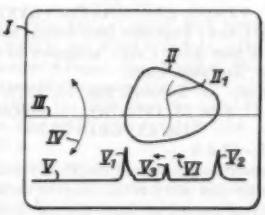
Franz Baumgartner, Zipf, Austria, assignor to Kretztechnik Gesellschaft m.b.H., Zipf, Austria

Filed Oct. 28, 1975, Ser. No. 626,066

Claims priority, application Austria, Nov. 6, 1974, 8911/74

Int. Cl.² G01N 29/00

U.S. Cl. 73—67.8 S **15 Claims**



1. A method of inspecting a moving object, which comprises the steps of

1. transmitting an ultrasonic sound beam into the moving object and moving the sound beam in a scanning plane transversely to the axis of the sound beam, the scanning plane being defined by the moving sound beam axis and the sound beam being moved in the scanning plane at a velocity sufficient for an instantaneous B-scan display of the moving object,

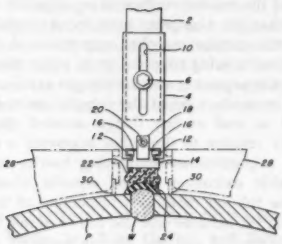
2. displaying the B-scan on a display screen in response to echo pulses produced in the scanning plane by the ultrasonic sound beam in the moving object,
3. producing an adjustable trace line in the B-scan display at a location which corresponds to a predetermined position of the sound beam during the movement thereof in the scanning plane, and
4. selectively displaying on the display screen a display other than the B-scan display in response to echo pulses produced when the sound beam is in the predetermined position.

4,010,635

SONIC INTERFERENCE SUPPRESSOR

John A. Patsey, Penn Hills Township, Allegheny County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Mar. 17, 1976, Ser. No. 667,764
Int. Cl.² G01N *29/04*
U.S. Cl. 73—67.8 S **5 Claims**



1. An apparatus for the ultrasonic inspection of a weld joining the edges of material, wherein ultrasonic energy is directed through a liquid couplant and the surface of the material near the weld, the improvement comprising
   support means mounted for relative movement with respect to the weld in the direction of the longitudinal axis of the weld surface,
   a layer of flexible wiping material attached to the supporting means and in sliding contact with the weld surface during inspection and
   a backing member of resilient material located between the layer of wiping material and the support means.

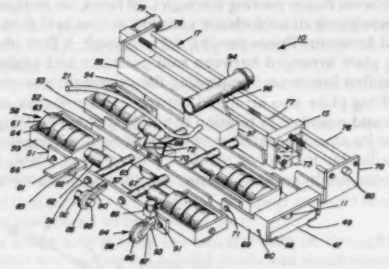
4,010,636

VESSEL EXAMINATION SYSTEM

Jack Phillip Clark; Thurman Dale Smith, and Alan Carl Foster, all of San Jose, Calif., assignors to General Electric Company, San Jose, Calif.

Division of Ser. No. 540,607, Jan. 13, 1975. This application Feb. 23, 1976, Ser. No. 660,651
Int. Cl.² G01N *29/04*
U.S. Cl. 73—67.8 S **11 Claims**

1. A magnetically adherent trackless vehicle adapted to be remotely propelled and steered over the surface of a magnetic body including curved surfaces thereof, comprising: a frame having a longitudinal axis; a pair of spaced wheels mounted to each of two opposite sides of said frame for supporting said vehicle on said surface, each of said wheels containing magnetic means in the form of permanent magnets for providing adherence of said vehicle to said vessel, each of said wheels being rotatably attached to one end of a suspension bracket extending generally laterally outward from said frame, the other end of said suspension bracket being pivotally attached to said frame whereby said wheels can maintain as flat a position as possible against said surface for increased adherence to curved surfaces thereof; separate electric drive motors coupled to the wheels on said opposite sides of said frame, said



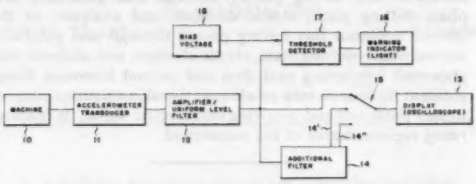
drive motors being separately and remotely energizable for propelling and steering said vehicle over said surface.

4,010,637

MACHINE VIBRATION MONITOR AND METHOD

Malcolm J. Harwell, Crawfordville, Fla.; Joe A. McInturff, Marietta, and Herbert J. Rubel, Atlanta, both of Ga., assignors to Lockheed Aircraft Corporation, Burbank, Calif.

Filed Oct. 6, 1975, Ser. No. 620,016
Int. Cl.² G01P *15/00*
U.S. Cl. 73—71.4 **10 Claims**



1. A monitor to measure the vibrating frequency of a machine caused by the unbalance of its internal rotors vibrating at several frequencies to determine in advance an approach of excessive vibration and an incipient failure of the machine comprising:
   an accelerometer transducer connected to said machine to receive the total vibration thereof at all operating speeds and produce a single output signal;
   an amplifier and uniform level filter connected to said transducer to receive said output signal and raise it to a predetermined substantially constant level over the entire speed range of said machine, said filter having components selected to simultaneously compensate for both the frequency dependence of said signal and the variable displacement allowables of said rotors; and
   an oscilloscope adapted to be connected to said filter to receive and display said constant level signal whereby it may be compared with a pre-established reference level of safe operation of said machine.

4,010,638

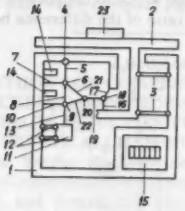
MASS AND FORCE METER

Mario Gallo, Zurich, Switzerland, assignor to Wirth Gallo and Company, Switzerland

Filed May 28, 1976, Ser. No. 691,094
Claims priority, application Switzerland, Feb. 9, 1976, 001577/76
Int. Cl.² G01L *1/10*
U.S. Cl. 73—141 R **2 Claims**

1. A mass and force meter having a frame, a load support and a digital computing device, a first and second electrically excited, transversely vibrating string, first transmission ele-

ments transmitting the mass or force to be measured to said strings, second transmission elements transmitting a pre-loading force to said strings, so that the resultant frequency variations caused by the application of said mass or force are used in the computing and display device for computation of the magnitude of said mass or force, said first transmission elements having a first and a second branch, a first guide fixed to



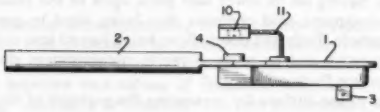
the frame, said first string having one end fastened to said frame and the other end connected to one end of said second string, to said first guide and to said first branch of said first transmission elements, a second guide fixed to the frame, the other end of said second string being connected to said second guide, to said second transmission elements and to said second branch of said first transmission elements.

4,010,639

MULTI PURPOSE TORQUE WRENCH

Delo Kwai Kum Chun, Mission Viejo, Calif., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Dec. 17, 1975, Ser. No. 641,569
Int. Cl.[2] B25B *23/14*
U.S. Cl. 73—139 **2 Claims**



1. A torque wrench for off position use comprising:
a wrench for rotating a fastener;
a calibrated dial operatively associated with the wrench for measuring the torque required to rotate the fastener;
an adjustably mounted mirror mounted on said wrench for reading said calibrated dial; and
a mirror image scale in combination with a conventional image scale on said calibrated dial for facilitating the reading of measured torque in any use position.

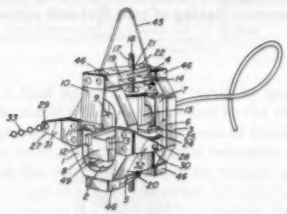
4,010,640

APPARATUS FOR MEASURING THE STIFFNESS CHARACTERISTIC OF STRUCTURAL ADHESIVES

Raymond Buchheimer Krieger, Jr., Abingdon, Md., assignor to American Cyanamid Company, Stamford, Conn.

Filed Oct. 16, 1975, Ser. No. 622,913
Int. Cl.[2] G01N *19/04*; G01B *7/24*
U.S. Cl. 73—150 A **10 Claims**

1. An apparatus adapted to be used in conjunction with a second apparatus having the same structure but of a mirror image configuration for the measurement of the shear stiffness characteristic of structural adhesives so as to enable the accurate stress analysis of an adhesive bond comprising
A. a first frame having an aperture therein,
B. a second frame,
C. a first plate spring fully fixed at one of its ends to the upper section of said first frame and at the other of its ends to the upper section of said second frame,
D. a second plate spring fully fixed at one of its ends to the lower section of said first frame and at the other of its ends to the lower section of said second frame,
E. a first supporting member on said second frame extending movably into said aperture,
F. a second supporting member on said first frame comprising a third spring which is positioned above said first supporting member, pivotably rotates on an axis and is adjacent said aperture,
G. a first sensor point fixedly mounted on said second supporting member within the confines of said aperture,
H. second and third sensor points fixedly mounted on said first supporting member within the confines of said aperture,
I. bracket means attached to said second frame,
J. adjusting means attached to the top and bottom of said first frame,
K. a linear, variable, differential transformer comprising a coil and a core, the coil of which is supported by said



bracket means and positioned within the space between said first and second frames and the core of which is affixed to said adjusting means and positioned within the hollow of said coil,
L. first locking means adjacent said adjusting means and adapted to prevent accidental movement thereof,
M. interactive, second locking means positioned adjacent to said first and second frames and adapted, when engaged, to minimize flexing of said first and second plate springs,
N. mounting plate spring means affixed to the first frame at its middle, extending beyond the vertical edges of said first frame and having attaching means within the extending portions thereof,
said sensor points being positioned such that said first point is above said second and third points and moves pivotably around an imaginary line drawn parallel to said second and third sensor points, said second and third points are in the same horizontal plane with respect to said first frame, and the tips thereof touch substantially the same vertical plane.

4,010,641

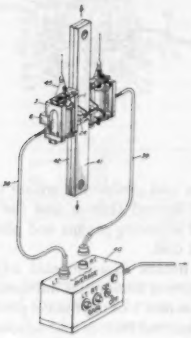
APPARATUS FOR MEASURING THE STIFFNESS CHARACTERISTIC OF STRUCTURAL ADHESIVES

Raymond Buchheimer Krieger, Jr., Abingdon, Md., assignor to American Cyanamid Company, Stamford, Conn.

Filed Oct. 16, 1975, Ser. No. 623,141
Int. Cl.[2] G01N *19/04*; G01B *7/24*
U.S. Cl. 73—150 A **9 Claims**

1. An apparatus adapted to be used in conjunction with a second apparatus having the same structure but of a mirror image configuration for the measurement of the shear stiffness characteristic of structural adhesives so as to enable the accurate stress analysis of an adhesive bond comprising
A. a first frame having an aperture therein,
B. A second frame,
C. A first plate spring fully fixed at one of its ends to the upper section of said first frame and at the other of its ends to the upper section of said second frame,
D. a second plate spring fully fixed at one of its ends to the lower section of said first frame and at the other of its ends to the lower section of said second frame,

E. a supporting member on said second frame extending movably into said aperture,
F. a first sensor point fixedly mounted on said first frame within the confines of said aperture,
G. second and third sensor points fixedly mounted on said supporting member within the confines of said aperture,
H. bracket means attached to said second frame,
I. adjusting means attached to the top and bottom of said first frame,
J. a linear, variable, differential transformer comprising a coil and a core, the coil of which is supported by said bracket means and positioned within the space between said first and second plate springs and said first and second frames and the core of which is affixed to said adjusting means and positioned within the hollow of said coil,
K. first locking means adjacent said adjusting means and adapted to prevent accidental movement thereof,
L. interactive, second locking means positioned adjacent to said first and second frames and adapted, when engaged, to minimize flexing of said first and second plate springs,



M. a mounting plate spring having an orifice therein commensurate in size with said aperture, being pivotably affixed at its middle to said first frame, extending beyond the vertical edges of said first frame and having attaching means within the extending portions thereof,

said sensor points being positioned such that said first and second points are in the same horizontal plane with respect to said first frame, said second and third sensor points are in the same vertical plane with respect to said first frame, said third sensor point is below said second sensor point and the tips of all three sensor points touch substantially the same perpendicular plane and said mounting plate spring being positioned such that the intersection made by a first imaginary line drawn between said attaching means and a second imaginary line drawn through the point of affixation thereof parallel to said second and third sensor points and perpendicular to said first imaginary line falls within the upper portion of the triangle formed by a third imaginary line connecting said three sensor tips and pivotal only about an axis represented by said second imaginary line.

4,010,642

BOREHOLE PRESSURE MEASUREMENT

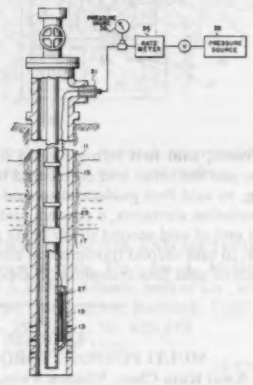
Billy W. McArthur, Wallis, Tex., assignor to Sperry-Sun, Inc., Sugar Land, Tex.

Continuation-in-part of Ser. No. 467,349, May 6, 1974, abandoned. This application Aug. 22, 1975, Ser. No. 606,911

Int. Cl.² E21B *47/04*

U.S. Cl. 73—151 **22 Claims**

1. Pressure measuring apparatus for extended, continuous use in boreholes in which the pressure is greater than the normal hydrostatic pressure, comprising:
a source of a pressurized test fluid at the surface for initially charging the apparatus;
a tube connected to the fluid source and extending into the borehole to a location where pressure is to be measured;
a chamber having a volume substantially larger than that of the tube and the ratio of which to the volume of the tube is at least equal to the ratio of the difference between the



maximum and minimum anticipated pressures in the borehole to the minimum anticipated pressure, said chamber being connected on its upper side to the tube and having on its lower side ports open to the borehole environment, said chamber thus being sized to prevent borehole fluids and debris from being forced into surface apparatus and to allow pressure measurement despite pressure fluctuations; and
means at the surface for measuring the pressure of the test fluid.

4,010,643

MEASURING DEVICE FOR TAPPING APPARATUS FOR FOAM-FORMING BEVERAGES

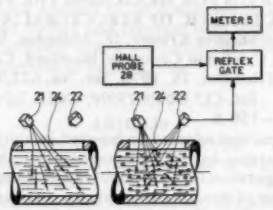
Istvan Dekan, Antonius-Kirchplatz 10, 44 Munster, Germany

Filed Jan. 17, 1975, Ser. No. 541,984

Claims priority, application Germany, Jan. 24, 1975, 2439789

Int. Cl.² G01F *5/00*

U.S. Cl. 73—194 R **8 Claims**



1. Measuring device for beverage-tapping apparatus having a feed line from a source of supply of the beverage and connected to said feed line, a measuring chamber, a volume measuring device with a meter connected thereto, and a value and valve outlet downstream of the measuring chamber, light sensing means positioned upstream of the measuring chamber

adapted to distinguish foam from compact liquid, said volume measuring device having at least one rotating means which revolves proportionately to the beverage flow, said rotating means acting on impulse sender means which sends at least one impulse to electronic gate means with each rotation, said gate means being adapted to also receive a signal from the sensing means and then act upon said meter with impulses to be counted only when compact liquid is present.

4,010,644

METHOD FOR COMPENSATION OF THE ELECTROCHEMICAL PERTURBING DIRECT CURRENT POTENTIAL IN INDUCTIVE FLOW MEASUREMENT WITH A PERIODICALLY SWITCHED UNIFORM FIELD

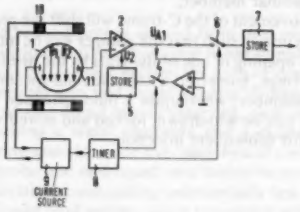
Karl Walter Bonfig, Bochum-Stiepel; Friedrich Hofmann, Duisburg-Grossenbaum; Wolfgang Stelz, Oberhausen, all of Germany, and Ronald van der Pol, Venlo, Netherlands, assignors to Ludwig Krohne K.G., Duisberg, Germany

Filed Feb. 28, 1975, Ser. No. 554,005

Claims priority, application Germany, Mar. 5, 1974, 2410407

Int. Cl.² G01F *1/58*

U.S. Cl. 73—194 EM **12 Claims**



1. Method of compensating for a perturbing electrochemical potential present at the electrodes in inductive measurement of fluid flow using a uniform field switched back and forth between two values of induction wherein a required voltage indicative of the fluid flow rate is combined with the electrochemical potential present to form a total signal which is processed by a signal processing chain, said method comprising the steps of:

summing and regulating to zero the total signal of the required voltage and perturbing potential at a first value of the said two values of induction, at the output of a measuring amplifier by applying a corresponding compensating magnitude to a suitable point in the signal processing chain, and

compensating the perturbing potential contained in the total signal from the second of said two induction values, by said magnitude

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4,010,645

DENSITY-RESPONSIVE MASS FLOW VORTEX TYPE METER

Peter J. Herzl, Morrisville, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Filed Mar. 19, 1976, Ser. No. 668,457

Int. Cl.² G01F *1/32*

U.S. Cl. 73—194 B **8 Claims**

1. A system for measuring a fluid stream wherein gas is interspersed with oil to provide separate mass flow readings of gas and oil, said system comprising:

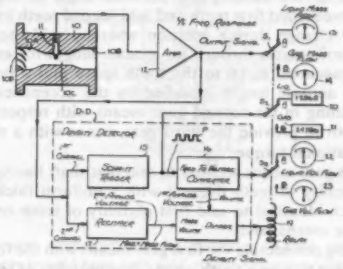
A. a vortex meter having a flow tube through which the stream is conducted to produce an output signal whose frequency depends on the volumetric flow and whose amplitude depends on the mass flow of the stream;

B. a liquid-mass flow indicator;

C. a gas-mass flow indicator;

D. a density detector responsive to the frequency of said output signal which varies as a function of volumetric flow and to the amplitude of said output signal which varies as a function of mass flow to produce a density signal whose level depends on whether there is gas or oil passing through the meter; and

E. switching means controlled by said density signal to



direct said output signal from said meter to said liquid-mass flow indicator which is responsive to the amplitude thereof to provide a reading of the mass of liquid in said fluid stream or to said gas-mass flow indicator which is responsive to the amplitude thereof to provide a reading of the mass of gas in said fluid stream, whichever indicator is appropriate to the fluid passing through the meter.

4,010,646

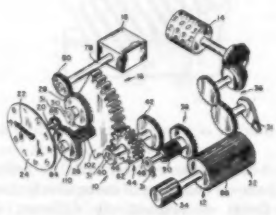
BAROMETRIC NON-LINEAR ALTITUDE COMPENSATOR MEANS

Donald P. Muhs, Davenport, Iowa, assignor to The Bendix Corporation, South Bend, Ind.

Filed Dec. 15, 1975, Ser. No. 640,522

Int. Cl.² G01L *7/12*

U.S. Cl. 73—387 **9 Claims**



1. A barometric pressure correction mechanism for providing an altimeter indicating means with a rotative torque to compensate for the non-linear relationship between barometric pressure and pressure altitude, said correction mechanism comprising:

a housing;

first shaft means fixed in said housing and responsive to rotative input torque;

first gear means located on said first shaft means having a first plurality of teeth thereon, each of said first plurality of teeth having a corresponding uniform thickness and pitch;

second gear means having a second plurality of teeth thereon each of which has a uniform thickness and pitch, said second gear means having a central opening eccentric to said axial center of the peripheral surface of said second plurality of teeth;

second shaft means fixed in said housing and extending through said central opening of the second gear means for

aligning said second plurality of teeth with said first plurality of teeth on the first gear means;

third gear means located on said second gear means, said third gear means having a third plurality of teeth thereon which drive a pointer associated with the indicator means to provide the altimeter indicating means with an operational input, said eccentric central opening in the second gear means causing the pressure angle of engagement between said first teeth and said second teeth to continually change during rotation whereby said second gear means rotates through an arcuate length for each tooth engagement equal to the tooth space plus a function of the acruate length modified by the eccentricity of the opening in the second gear means with respect to each tooth to provide the third gear means with a non-linear rotational torque;

fourth gear means secured to said first shaft having a fourth plurality of teeth thereon with a uniform thickness and pitch identical to said first plurality of teeth on the first gear means; and

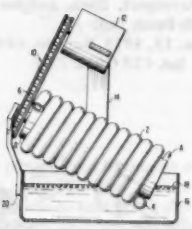
a spring connecting the first gear means with the fourth gear means to bias a tooth on the first plurality of teeth and a tooth on the fourth plurality of teeth into continual engagement with a tooth on the second plurality of teeth.

4,010,647

SAMPLING METHOD AND APPARATUS

Fred N. Kissell, and Robert P. Vinson, both of Pittsburgh, Pa., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Dec. 24, 1975, Ser. No. 644,265
Int. Cl.² G01N *1/22*
U.S. Cl. 73—421.5 R **10 Claims**



1. The method of obtaining a series of fluid samples which comprises

rotating a helical tube means about its helical axis while passing an open end thereof successively through first and second fluids of respectively different densities and thereby screwing a plurality of slugs of the first fluid separated from one another by slugs of the second fluid into the tube along the length thereof, and then withdrawing samples by inserting a hypodermic needle through the tube means wall.

4,010,648

ADAPTER UNIT FOR USE IN SAMPLING FLUID SPECIMENS

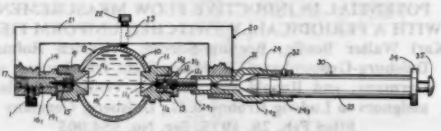
Rano J. Harris, Sr., 1945 Carolyn Sue Drive, Baton Rouge, La. 70815, and Julius P. Averette, Jr., 4332 Delaware St., Baton Rouge, La. 70805

Filed Oct. 1, 1975, Ser. No. 618,373
Int. Cl.² G01N *1/14*
U.S. Cl. 73—423 R **10 Claims**

1. An adapter unit for the receipt and containment of a fluid specimen sampled from a source at sub-atmospheric or supra-atmospheric pressure, useful in facilitating transfer of the fluid specimen from said adapter unit to apparatus comprising a valved needle syringe, which adapter unit comprises:

a tubular member formed by a wall which surrounds a void within which fluid can be contained, the wall of which is fitted with oppositely disposed tubular seals, each of which contains an axial opening therethrough, and through the axial openings in at least one of which is mounted a reciprocable plunger,

a C-shaped frame one end of which can be secured to a side of the reciprocable plunger mounted within the tubular seals of the tubular member, and the other end of which is provided with a holder within which the needle syringe can be placed, and held such that the needle portion thereof can be partially inserted into the axial opening of



a seal adjacent the non-secured end of the reciprocable plunger of the tubular member which also lies therein,

means for receipt of a fluid specimen from the source, and means for containing the fluid specimen within the void of said tubular member,

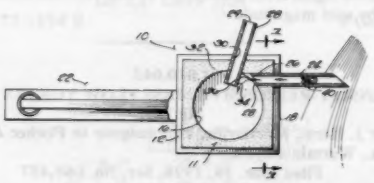
whereby movement of the C-frame will shift the plunger and holder in unison such that the plunger will be moved from the axial opening of one of the seals by the needle portion of the syringe, immersed within the fluid specimen of the tubular member, whereupon a fluid specimen at source pressure can be withdrawn, locked and stored within the syringe for subsequent injection.

4,010,649

MOLTEN METAL SAMPLERS WITH FLOW DIVERTER

Richard A. Falk, 519 Westminster Drive, Waukesha, Wis. 53186

Filed Nov. 10, 1975, Ser. No. 630,467
Int. Cl.² G01N *1/12*
U.S. Cl. 73—425.4 R **9 Claims**

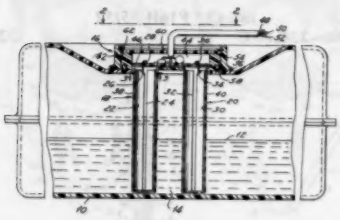


1. A molten metal sampler comprising wall means defining a mold cavity for forming a sample, wall means defining a sample entry passage having an inlet for receiving molten metal and an outlet communicating with said mold cavity and providing a linear flow path of metal into said cavity, flow diverter means on said wall means defining said mold cavity and located in said mold cavity and positioned in said mold cavity to divert the flow of molten metal within said mold cavity from said linear flow path to afford thorough mixing of the deoxidant and provide a uniform sample free of structural voids.

4,010,650
APPARATUS FOR GENERATING AN ELECTRICAL SIGNAL INDICATIVE OF LIQUID LEVEL

Philip Piatkowski, Jr., Fraser, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 26, 1974, Ser. No. 536,663
Int. Cl.² G01F *23/26*
U.S. Cl. 73—304 C **2 Claims**



1. Apparatus for generating an electrical signal indicative of the level of a liquid stored in a reservoir, said apparatus comprising:

first and second probes spaced from one another and extending into said reservoir, said liquid stored in said reservoir contacting said probes, the area of contact between said probes and said liquid varying in proportion to the level of said liquid in said reservoir, each of said probes comprising a metal electrode and a dielectric material covering said electrode over said area of contact between said probe and said liquid, said dielectric material having an electrical conductivity substantially less than that of said liquid, said probes, when in contact with said liquid, forming two series-connected capacitors having said liquid as a common plate of said two capacitors;

circuit means for applying a constant amplitude alternating voltage across said electrodes, said alternating voltage having a frequency which produces an impedance of said series-connected capacitors having a reactive component at least about five times greater that the resistive component thereof; and

circuit means for generating an electrical signal proportional to the impedance between said electrodes, said electrical signal being indicative of the level of said liquid stored in said reservoir.

4,010,651
TWO-STAGE WHEEL BALANCER

Wallace F. Mitchell, Mettawa, Ill., assignor to Ammco Tools, Inc., North Chicago, Ill.

Filed July 28, 1975, Ser. No. 599,826
Int. Cl.² G01M *1/12*
U.S. Cl. 73—483 **6 Claims**

1. Apparatus for balancing a rotor, comprising

a base,

a rotor support having an annular planar rotor support surface and an upstanding central tubular section,

means for indicating the angular position of said rotor support surface relative to the horizontal plane,

a rigid tubular member extending upwardly from said base into said tubular section of said rotor support,

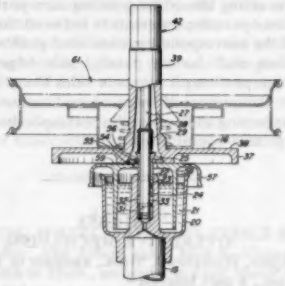
a rod mounted in said tubular member for coaxial sliding movement therein,

means for pivotalably supporting said rotor support on the upper end of said rod,

a downwardly facing frusto-conical external annular shoulder on said tubular member,

an upwardly facing complimentary frusto-conical internal annular surface disposed on said rotor support below said annular shoulder and surrounding said tubular member, and

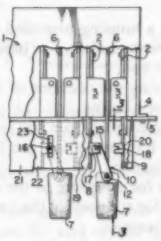
spring means compressed between said rod and said tubular member for urging said annular surface into facial engagement with said annular shoulder to lock said rotor support to said base with said planar rotor support surface lying perpendicular to the longitudinal axis of said rod.



4,010,652
ACTUATOR FOR PUSHBUTTON TUNER

Yoshihiro Sugimoto, and Tsunefusa Suzuki, both of Tokyo, Japan, assignors to Nihon Technical Kabushiki Kaisha, Japan

Filed May 15, 1975, Ser. No. 577,766
Claims priority, application Japan, May 20, 1974, 49-56374[U]
Int. Cl.² F16H *35/18*
U.S. Cl. 74—10.33 **2 Claims**



1. Tuner actuator mechanism comprising, a plurality of parallel pushbutton slides movable axially between an inoperative position and an operative position, for each pushbutton slide a pair of tuning slides connectable operatively with a common slide therebetween and parallel thereto, for each pushbutton slide an interconnecting member for operatively connecting a corresponding pushbutton slide alternatively with either one of the tuning slides associated therewith and for maintaining the operative connection so that a selected tuning slide can be moved between its inoperative position and its operative position as the pushbutton slide is actuated, shift means for moving each interconnecting member alternatively to a pair of operational positions in order to release an operative connection between a pushbutton slide and a selected tuning slide and to operatively connect the pushbutton slide with the other tuning slide associated therewith, said interconnecting member comprising a single-piece member having a flat body portion with one end pivotally connected with the corresponding pushbutton and an upwardly inclined cam portion as an extension of said body portion terminating in a pin in a plane substantially normal to said flat body portion at a free end of said interconnecting member, said shaft means having individual slots in which individual pins of corresponding interconnecting members are received for actuating of the interconnecting members to said pair of operational

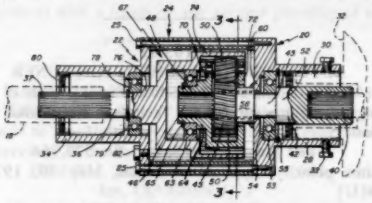
positions thereof, each pair of said tuning slides having opposed notches on opposite sides of the corresponding common pushbutton slide and interconnecting member for alternatively receiving the corresponding cam portion thereof for effecting an operative connection between the pair of tuning slides and the corresponding associated pushbutton slide, and said notches each having parallel side edges engaging the inclined cam portion on opposite sides thereof for applying a downward component of force on said inclined cam and corresponding tuning slide when the corresponding pushbutton is actuated to said operative position.

4,010,653

OVERDRIVE MECHANISM

John Mekjian, Watertown, Mass., assignor to Jack Katz, Newton, Mass., a part interest

Filed May 27, 1975, Ser. No. 580,612
Int. Cl.² F16H *3/44*
U.S. Cl. 74—781 R **7 Claims**



1. An overdrive mechanism for coupling between the output transmission shaft and the drive shaft of a motor vehicle comprising;

means defining a housing provided in at least two sections and having means defining an input end and means defining an output end,

means for securing the sections of the housing together to form a unitary housing,

an input shaft driveable from the transmission shaft,

bearing means for supporting the input shaft at the input end of the housing,

an output shaft for coupling to the drive shaft,

bearing means for supporting the output shaft at the output end of the housing,

a sun gear disposed in the housing and having means for securing the sun gear in a non-rotatable position,

a plurality of pinion gears,

means for commonly supporting the pinion gears in spaced relative relationship and intermeshed with the sun gear,

means securing the input shaft to the means for commonly supporting for driving the later when the input shaft is driven,

an integrally toothed ring gear,

means for supporting the ring gear with its teeth intermeshed with said pinion gears,

and means securing the ring gear to the output shaft whereby the output shaft is driven from the ring gear,

said sun gear having a passage therethrough for receiving the input shaft which is supported by the input shaft bearing means on one side of the sun gear extends through the sun gear and connects to the common support means on the other side of the sun gear,

said sun gear having a gear section and a collar extending axially therefrom,

said housing having a wall extending normal to the axis of the sun gear and input shaft and defining an aperture of a diameter large enough to accommodate the input shaft but smaller than the diameter of the collar of the sun gear,

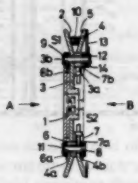
said collar contacting the normal wall of the housing about a circular locus and being secured thereto by a weld between the collar and the normal wall.

4,010,654

VARIABLE PULLEY PART FOR A DRIVE ACTING THROUGH A TENSION MEDIUM STRAND, SUCH AS A V-BELT

Paul Maucher, Sasbach, and Karl Keck, Achern, both of Germany, assignors to LuK Lamellen und Kupplungsbau GmbH, Buhl, Germany

Filed Dec. 15, 1975, Ser. No. 640,650
Claims priority, application Germany, Dec. 14, 1974, 2459258
Int. Cl.² F16H *55/52*
U.S. Cl. 74—230.17 C **32 Claims**



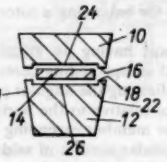
1. Variable pulley for a drive acting through a tension medium strand comprising two pulley parts, at least one of which is displaceable in axial direction relative to the other, each of said pulley parts having a running surface for a tension medium strand, at least one of said pulley parts being mounted on a shaft-like member, at least two systems having means mutually connecting said pulley parts to one another, said at least two systems being axially spaced from one another and affording axial displacement of said at least one pulley part, said systems, on the one hand, being firmly linked to said at least one pulley part and, on the other hand, having means for linking said systems to a part of a drive which is to act through a tension medium strand, said systems being synchronously and concentrically rotatable with the part of the drive.

4,010,655

DRIVE BELTING AND DRIVE BELTS MANUFACTURED THEREFROM

Ernest Pollard, Bank House, Harden, Bingley, Yorkshire, England

Filed Jan. 19, 1976, Ser. No. 649,947
Int. Cl.² F16G *1/00, 5/00, 9/00*
U.S. Cl. 74—231 P **7 Claims**

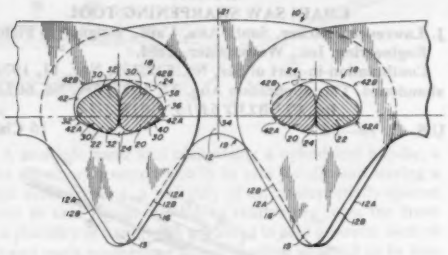


1. Drive belting comprising at least one elongate polyurethane body element and at least one elongate constraining element of woven tape, the warp threads of said woven tape constraining element having a higher modulus of elasticity than the body element, being resistant to heat shrinkage, and extending throughout the length of the body element but totally enveloped in the body element to resist extension of the body element.

4,010,656
POWER TRANSMISSION DRIVE

Joseph O. Jeffrey, Ithaca, N.Y., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Feb. 7, 1974, Ser. No. 440,440
Int. Cl.² F16G *15/00, 15/12*
U.S. Cl. 74—245 S **37 Claims**



1. A power transmission chain of the type adapted to cooperatively engage driving means on a rotating member comprising:

a series of overlapping and interlaced sets of links having aligned apertures formed therethrough; and

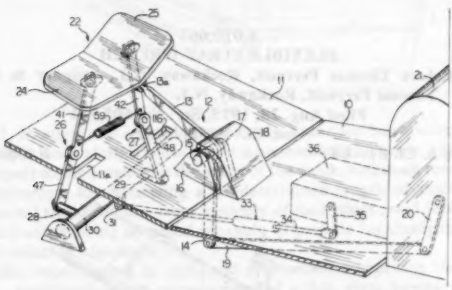
pivot means positioned apertures forming said chain with articulating joints;

said pivot means comprising a pin and a rocker each of which is generally three lobed and generally trilateral in cross-section with three major surfaces, the adjacent ones of which are connected and with at least one of said pin and rocker having an arcuate major surface in rocking engagement with an adjacent major surface of the other.

4,010,657
BUTTERFLY FOOT PEDAL CONTROL

John K. Amdall, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 21, 1975, Ser. No. 634,019
Int. Cl.² G05G *9/04, 1/14*
U.S. Cl. 74—478 **6 Claims**



1. A multifunction control pedal and linkage arrangement comprising:

a first lever mounted for pivotal movement about a pivot point and including one end for pivotally supporting a rocker pedal and another end for transmitting motion to an engine throttle linkage;

a rocker pedal pivotally mounted on said one end of said first lever for rocking movement about an axis transverse to the pivot axis of said first lever;

a rocking member mounted for rocking movement about an axis parallel to the pivot axis of said first lever and having an arm extending from each side of the axis thereof;

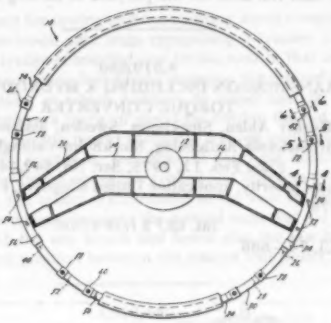
first linkage means having a locked position and a collapsed position connecting said pedal at one side of the pivot axis of said pedal to one arm of said rocking member; and,

second linkage means having a locked position and a collapsed position connecting said pedal at the other side of said axis to the other of said arms, the connection of said first and said second linkage between said pedal and said rocking member being such that said linkages are locked when said pedal is in a centered position and when said pedal is rocked, one side or the other, about the axis thereof one of said linkages is collapsed and the other is locked for transmitting motion to said rocking member.

4,010,658
STEERING WHEEL HAVING FLEXIBLE RIM

George H. Muller, Ann Arbor, and Lloyd R. Vivian, Jr., Birmingham, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 19, 1975, Ser. No. 642,644
Int. Cl.² B62D *1/04*; G05G *1/10*
U.S. Cl. 74—552 **8 Claims**



1. A steering wheel for a motor vehicle having a hub, a spoke connected to said hub and rim means connected to said spoke;

said rim means comprising a circular leaf spring core member;

at last one arcuate leaf spring member positioned with its midportion adjacent the end of said spoke;

securing means securing said core member and said arcuate member to the end of said spoke;

said rim means being resiliently deflectable under an impact load imposed upon said rim means in a direction parallel to the axis of rotation of said wheel and said rim means being substantially rigid against deflection with respect to a force imposed upon said rim means in a plane perpendicular to the axis of said wheel.

4,010,659
STEERING WHEEL HAVING HELICAL RIM CORE

George H. Muller, Ann Arbor, and Warren A. VanWicklin, Jr., Dearborn, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 19, 1975, Ser. No. 642,411
Int. Cl.² B62D *1/04*; G05G *1/10*
U.S. Cl. 74—552 **7 Claims**

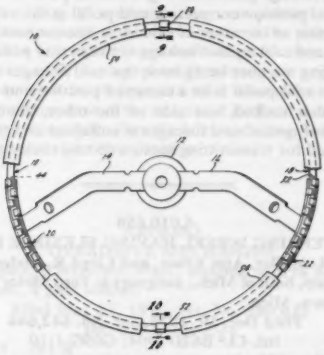
1. A steering wheel for a motor vehicle having a hub, a rim core and a spoke interconnecting said hub and rim core;

said rim core comprising a one-piece spring metal helix;

a center of said helix lying on the axis of rotation of said steering wheel;

said rim core being resiliently deformable in response to an impact load imposed upon said core in a direction parallel to the axis of said steering wheel;

said rim core being constructed to be substantially rigid with respect to a tangential force applied by a vehicle operator to said rim core for the purpose of turning said vehicle.



4,010,660

TRANSMISSION INCLUDING A HYDRODYNAMIC TORQUE CONVERTER

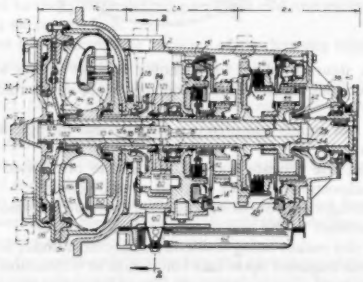
Karl Gustav Ahlen, Stockholm, Sweden, assignor to S.R.M. Hydromekanik Aktiebolag, Stockholm-Vallingby, Sweden

Filed Feb. 12, 1975, Ser. No. 549,449

Claims priority, application United Kingdom, Feb. 14, 1974, 6856/74

Int. Cl.² F16H *47/08*

U.S. Cl. 74—688 **16 Claims**



1. A transmission comprising:

a stationary housing,

a torque converter having a rotatable casing forming therein a working chamber which includes therein at least one ring of pump blades adapted to be driven by the rotatable casing, at least one ring of guide blades, and at least one ring of turbine blades, turbine shaft adapted to be drivingly engaged by the ring of turbine blades,

a guide ring shaft extending axially from said guide ring, a brake operatively engagable with said guide ring shaft for holding the guide ring fixed with respect to said stationary housing,

a central assembly block surrounding said guide ring shaft and secured to the stationary housing, said brake being mounted in said central assembly block,

and journal means which comprises the major radial journal of the guide ring shaft, and hence also of the guide ring, constituted by a journal bearing which journals the guide ring shaft in the central assembly block, said journal means also including means for axially journalling the guide vane shaft in the central assembly block, and including axial thrust bearings between the guide ring and the other said bladed rings of the torque converter.

4,010,661

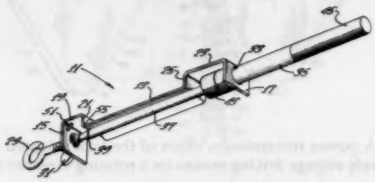
CHAIN SAW SHARPENING TOOL

J. Lawrence Fletcher, Santa Ana, Calif., assignor to Fletcher Engineering, Inc., Westminster, Calif.

Continuation-in-part of Ser. No. 522,339, Nov. 11, 1974, abandoned. This application Aug. 22, 1975, Ser. No. 607,049

Int. Cl.² B23D *63/16*; G01B *5/14*

U.S. Cl. 76—36 **16 Claims**



14. A guide for supporting a cylindrical file for sharpening a chain saw blade, said blade having teeth which include a cutting toe spaced from a depth gage, comprising:

a beam having a first and second pair of adjacent surfaces, each of said surfaces forming a plane extending in a direction normal to the axis of said beam, each of said pairs of surfaces including a first surface for resting flat on said cutting toe and a second surface for simultaneously resting on said depth gage, said surfaces positioned such that, when the first surface of one of said surface pairs rests on said cutting toe, the second surface of the other of said surface pairs rests on said depth gage if said depth gage is properly calibrated; and

means for supporting said file on said beam parallel to the axis of said beam and within said notch.

4,010,662

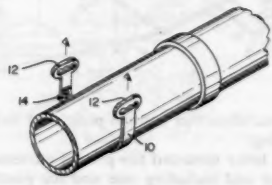
FLEXIBLE STRAP WRENCH

Robert Thomas Perrault, Rockaway, N.J., assignor to R. Thomas Perrault, Rockaway, N.J.

Filed Aug. 28, 1975, Ser. No. 608,781

Int. Cl.² B25B *13/52*

U.S. Cl. 81—64 **8 Claims**



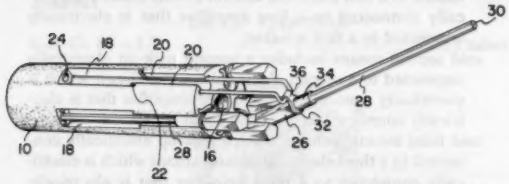
1. A flexible strap wrench comprising an elongated substantially rectangularly shaped strip of material, said material having two distal end portions having handle means unitary therewith and at least two surfaces, a plurality of raised ribs dispersed substantially about at least one surface of said material adapted to frictionally engage a workpiece, each of said ribs being cone shaped and including a plurality of annular rings therearound.

4,010,663

MULTIPLE HAND TOOL

Allan Rydberg, 76 Chapman Ave., Warwick, R.I. 02886

Filed Apr. 28, 1976, Ser. No. 681,130
Int. Cl.² B25B 13/48
U.S. Cl. 81—71 10 Claims



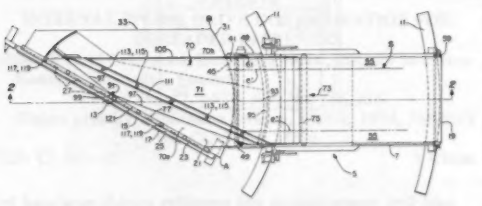
1. A multiple hand tool comprising a cylindrical handle, a socket member mounted axially in said handle and having a central axial opening, a plurality of circumferentially spaced grooves in said handle extending rearwardly from the front end, a plurality of hand tools mounted in said grooves, each of said hand tools comprising a base portion adapted to fit into said socket opening, an integral elongated shank extending from said base, the outer end of said shank forming the hand tool, a U-shaped wire supporting member having a short central portion and spaced parallel arms extending integrally at right angles from said central portion, said tool base portion being pivotally mounted on said central portion, said wire arms being slidably mounted in said groove to mount a tool in said groove, whereby said tool can be pivoted to nest in its groove and pivoted outwardly in alignment with said socket opening, said wire arms permitting sliding movement to nest said base in said opening.

4,010,664

BIAS PLY CUTTER FEED APPARATUS

Richard P. Marshall, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 19, 1976, Ser. No. 668,551
Int. Cl.² B26D 5/20, 7/06
U.S. Cl. 83—277 6 Claims



1. In apparatus including a bias-ply cutter for bias-cutting tire ply stock along a shear line at a preselected bias angle with respect to the lengthwise direction of the stock, and stock feed mechanism for advancing a predetermined length of stock beyond the shear line from a supply of such stock, said feed mechanism being mounted movably to provide for changing the selected bias angle;

the improvement in said feed mechanism comprising the combination and arrangement of a first plate having a straight line edge fixed adjacent and parallel to the shear line and an arcuate edge;

a second plate coplanar with the first plate having a conjugate edge closely opposed to the arcuate edge of the planar plate and mounted for pivotal movement about an axis normal to the shear line;

a feed pan having a smooth continuous flat top surface extending perpendicularly of said direction beyond the respective longitudinal edges of said stock and extending parallel to said direction to a rear edge normal to said direction and to a forward edge line oblique to said direction, said pan being slidable over the first and second plates parallel to said direction;

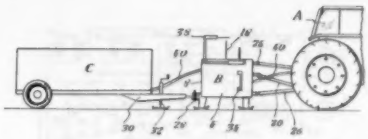
means for clamping said stock to said pan, and means for moving said pan a preset distance forwardly toward said shear line.

4,010,665

MOBILE SAW BENCH FOR FARM USE AND THE LIKE

Archibald Watson Kidd, Seend Close, Seend, Melksham, Wiltshire, England

Filed Dec. 2, 1974, Ser. No. 528,898
Claims priority, application United Kingdom, Dec. 10, 1973, 57050/73
Int. Cl.² B27B 5/10
U.S. Cl. 83—477.2 8 Claims



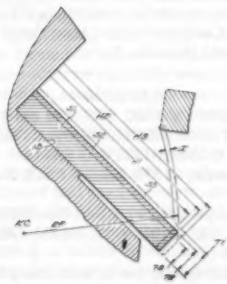
1. Equipment for sawing and transporting wood comprising a train of machines, said train comprising a tractor, a saw bench and a trailer connected one to the next in that order, said saw bench having feet firmly engaging the ground in its lowered position, at which position its upper surface is in position to receive a piece of wood for cutting thereof, said tractor having raising means including a three point linkage connecting the tractor to the front of said saw bench for raising said saw bench above the ground and lowering it to the ground while the trailer is connected to the rear of the saw bench with its wheels engaging the ground such that the train can move with the saw bench and hence also the saw bench feet in a raised position between the tractor and trailer.

4,010,666

PERFORATING BLADE

Christopher F. Masters, 2525 S. Shore Drive, Milwaukee, Wis. 53207

Division of Ser. No. 512,839, Oct. 4, 1974, Pat. No. 3,973,452, which is a continuation-in-part of Ser. No. 317,838, Dec. 22, 1972, abandoned. This application Jan. 9, 1976, Ser. No. 647,835
Int. Cl.² B26D 1/38
U.S. Cl. 83—678 4 Claims



1. In a knife roll for use in web perforating apparatus, said knife roll including at least two recesses for mounting perforating blades around its periphery, said recesses having surfaces for mounting perforating blades at a common angle greater than 0° but less than 90° with a radial line, and wherein said recesses are formed from intersecting surfaces on the knife roll with the intersections of said recesses being at a common distance from the axis of said roll, the improvement

comprising a plurality of perforating blades loaded in said knife roll recesses, at least one of said blades having a different thickness than the remainder of said blades and in which all blades project from said knife roll face a common distance.

4,010,667

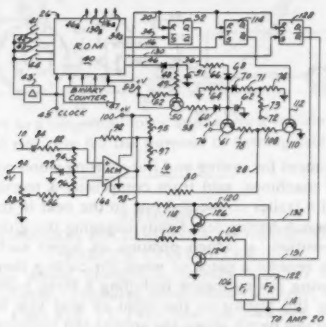
RHYTHM UNIT WITH PROGRAMMED ENVELOPE WAVEFORM, AMPLITUDE, AND THE LIKE

Alberto E. Kniepkamp, 31 N. Prindle, Arlington Heights, Ill. 60004

Continuation of Ser. No. 389,342, Aug. 17, 1973, abandoned. This application Aug. 28, 1975, Ser. No. 608,624

Int. Cl.² G10F *1/00*

U.S. Cl. 84—1.03 **22 Claims**



20. An electronic musical instrument comprising:

a. a sound output system including an amplifier and a loudspeaker,

b. rhythm generator means for producing a series of pulses at times related to each other so as to form rhythm patterns.

c. a tone signal source,

d. modulator means connected with said tone signal source for modulating said tone signal in response to some of the pulses produced by said rhythm generator means,

e. connecting means for connecting said modulator means with said amplifier,

f. bi-stable means connected to said rhythm generator for receiving certain ones of said pulses and for changing its state in response to alternate ones of said pulses which are received, and

g. control means connected to said bi-stable means and to said modulator means for controlling the amplitude of at least a part of said modulated tone signal in response to the state of said bi-stable device.

4,010,668

POLYSONIC ELECTRONIC SYSTEM FOR A MUSICAL INSTRUMENT AND METHODS OF UTILIZING AND CONSTRUCTING SAME

John P. Plueddemann, 21370 Inkster Road, Southfield, Mich. 48075

Filed Apr. 21, 1975, Ser. No. 569,835

Int. Cl.² G10H *3/08*; **H04M** *1/00*

U.S. Cl. 84—1.16 **7 Claims**

1. An accoustical system for an instrument having a plurality of strings, comprising, in combination:

first means for detecting and amplifying sounds produced by a first predetermined number of said plurality of strings;

second means for detecting and amplifying sounds produced by a second predetermined number of said plurality of strings;

third means for detecting and amplifying sounds produced by a third predetermined number of said plurality of strings; and

fourth means for detecting and amplifying sounds produced by a third predetermined number of said plurality of strings;

said instrument includes a bridge;

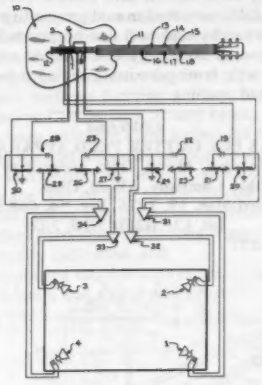
said first means includes a first pick-up electrically connected to a first electrical control circuit which is electrically connected to a first amplifier that is electrically connected to a first speaker;

said second means includes a second pick-up electrically connected to a second electrical control circuit which is electrically connected to a second amplifier that is electrically connected to a second speaker;

said third means includes a third pick-up electrically connected to a third electrical control circuit which is electrically connected to a third amplifier that is electrically connected to a third speaker;

said fourth means includes a fourth pick-up electrically connected to a fourth electrical control circuit which is electrically connected to a fourth amplifier that is electrically connected to a fourth speaker;

said instrument comprises a guitar;



said first means detects and amplifies sounds produced by all of said plurality of strings to provide a rhythm component of the sound;

said second means detects and amplifies the sounds produced solely by the first third of said strings of the guitar;

said third means detects and amplifies the sounds produced solely by the second third of said plurality of strings of the guitar;

said fourth means detects and amplifies the sounds produced solely by the third third of said plurality of strings of the guitar;

said speakers being positioned at the four corners of a room so that as the guitar is strummed, the sound emanating from said speakers would seem to move around the room;

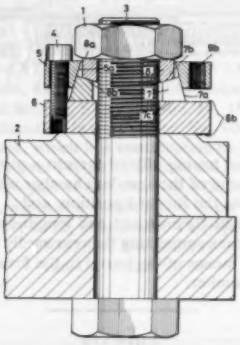
said speakers being so arranged in the room so that the sound emanating from said second, third and fourth speakers harmonizes with the sound emanating from said first speaker to give a stereo effect from the corners of the room; and

each of said first, second, third and fourth means having its own volume and tone control so that the room may be completely filled with sound which is balanced out proportionately at the corners of the room.

4,010,669
BOLT TENSIONING ARRANGEMENT

Ulrich Klören, Krefeld, Germany, assignor to Ringfeder GmbH, Krefeld-Uerdingen, Germany

Filed Dec. 17, 1975, Ser. No. 641,702
Claims priority, application Germany, Dec. 21, 1974, 2460961
Int. Cl.² F16B *35/00*
U.S. Cl. 85—1 T 15 Claims

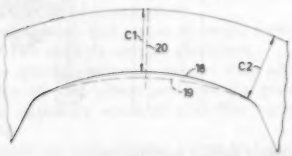


1. An arrangement for stressing a bolt by applying an axial force which acts between an element from which a portion of the bolt extends and a nut element threaded onto this portion, comprising a first and a second ring adapted to surround said portion axially spaced from one another; first means for applying to said rings an axially acting first force operative for moving said rings relative to one another in direction axially of said portion; and second means for amplifying said first force and for applying to one of said element an axially acting second stressing force which is greater than said first force and acts axially upon said portion and stresses said bolt.

4,010,670
INTERNAL SPLINE DRIVE CONFIGURATION FOR THREADED FASTENERS

Sixten Harald Lejdegard, Ramnas, Sweden, assignor to Bulten-Kanthal Aktiebolag, Sweden

Filed Mar. 7, 1975, Ser. No. 556,286
Claims priority, application Sweden, Mar. 8, 1974, 7403089
Int. Cl.² F16B *23/00*
U.S. Cl. 85—45 1 Claim



1. A rotatable threaded fastener having an internal spline drive formation, comprising:

a. 12 splines equally angularly spaced about the axis of the fastener, said splines being defined at least in part by convexly-curved segments of cylindrical surfaces;

b. 12 circumferentially arranged grooves having bottoms alternating with said splines;

c. each end of each of said groove bottoms intersecting an adjacent spline surface to define 24 regions of intersection, each region of intersection having a very small radius of curvature and lying at a common radius from said axis of the fastener; and

d. the bottom of each of said grooves being defined by a concavely curved segment of a cylindrical surface having a radius of curvature which is less than the length of said common radius, its center of curvature being located at a point substantially 25 percent of the length of said common radius from said axis, the radius of each groove bottom increasing slightly with respect to said axis from said regions of intersection toward the center of the groove.

4,010,671
WALL CONSTRUCTION

S. Eugene Hubbard, and Lawrence F. Biebuyck, both of Niles, Mich., assignors to Kawneer Company, Inc., Niles, Mich.

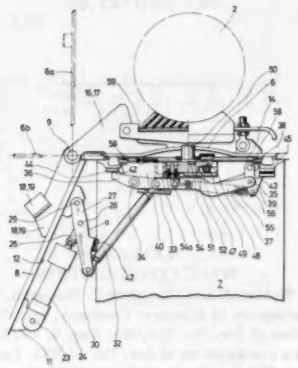
Continuation of Ser. No. 279,066, Aug. 9, 1972, abandoned, which is a continuation of Ser. No. 41,951, June 1, 1970, abandoned. This application May 4, 1976, Ser. No. 682,969
Int. Cl.² F16B *35/04*
U.S. Cl. 85—47 6 Claims

1. A fastener for insertion along a longitudinal axis of a screw spline having a noncircular transverse cross-section formed with opposed side walls, said fastener comprising an elongated shank and a head structure at one end of a longitudinal axis of said shank, said shank including segmented thread sections formed on opposite sides thereof and a pair of parallel flattened sides substantially normal to said first mentioned opposite sides, said head portion including an outer end segment extending generally radially outward of said shank and dimensioned to pass through a circular opening in a structural member, said head portion including a first seating surface sloping inwardly toward said shank and away from an outer end surface of said head structure, and a bearing spacer segment intermediate said first seating surface and said shank, said bearing spacer segment having at least one arcuate bearing surface having a radius substantially the same as said circular opening of said structural member for bearing against said member when seated in said hole, said bearing spacer segment including a second seating surface substantially normal to said shank adapted to engage an end surface of said screw spline, said bearing surface formed eccentrically of said longitudinal axis of said shank, said fastener shank insertable longitudinally of said screw spline with said flattened sides facing said opposed side walls and rotatable a quarter turn about said longitudinal axis wherein said thread segment digs into said side walls and draw said second seating surface tightly against said end surface of said screw spline.

4,010,672
DRIVING MECHANISM FOR THE COVER OF AN AMMUNITION MAGAZINE ON ARMORED LAND VEHICLES

Hans Kolbinger, Hofolding, and Ulf Wossagk, Taufkirchen, both of Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany

Filed Nov. 4, 1975, Ser. No. 628,771
Claims priority, application Germany, Nov. 28, 1974, 2456186
Int. Cl.² F41F 9/06
U.S. Cl. 89—1.802 **7 Claims**



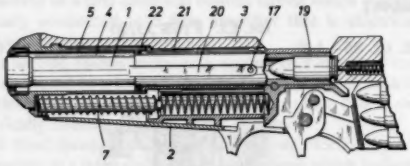
1. A driving mechanism for the cover of an ammunition magazine for an armored land vehicle including a launching device for said ammunition, means for loading said ammunition into said launching device from said magazine, and means pivotally mounting said cover on said vehicle, said driving mechanism comprising hydraulic driving means for pivotally driving said cover through an angle of about 90° between a generally horizontal closed position and a generally vertical position to open said magazine for loading of said ammunition from said magazine into said launching device, a mechanical locking device for releaseably locking said cover with said hydraulic driving means for enabling driving engagement therebetween, said locking device being releaseable to enable disengagement between said cover and said hydraulic driving means to permit manual pivotal movement of said cover through an angle of 180° to open said magazine for charging thereof with ammunition, said locking device including means for blocking movement of said hydraulic driving means when said locking device is released to disengage said cover from said hydraulic driving means.

4,010,673
SMALL ARM

Hannes Kepplinger, Kufstein, and Hermann Schweighofer, Steyr, both of Austria, assignors to Steyr-Daimler-Puch Aktiengesellschaft, Vienna, Austria

Filed Nov. 7, 1975, Ser. No. 629,696
Claims priority, application Austria, Nov. 28, 1974, 9560/74
Int. Cl.² F41D 11/12
U.S. Cl. 89—191 A **2 Claims**

1. A small arm comprising
a. a grip,
b. a barrel fixedly inserted in the grip, the barrel having
1. a forward end protruding from the grip,
2. a rear end,
3. a barrel chamber at the rear end, and
4. transverse bore means adjacent the barrel chamber,
c. a breechblock surrounding the barrel and reciprocably movable therealong to and from a forward position, the breechblock being resiliently biased into the forward position and including
1. a cylinder surrounding the barrel and defining a sealed annular chamber with the barrel adjacent the forward end thereof, the annular chamber having a rear end spaced from the barrel chamber forwardly of the transverse bore means, and

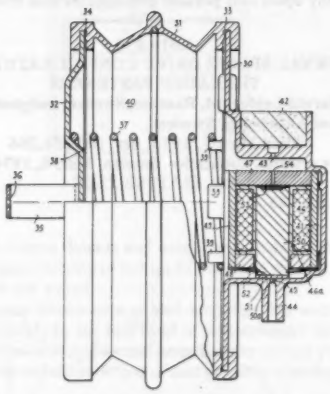


2. the barrel having affixed thereto a piston disposed at the rear end of the annular chamber when the breechblock is in the forward position, and
d. circumferentially enclosed and longitudinally extending passage means connecting the rearwardly disposed transverse bore means of the barrel to the forwardly disposed annular chamber.

4,010,674
SPEED RESPONSIVE SYSTEMS

John Noddings, and Norman Hunt, both of Leamington Spa, England, assignors to Associated Engineering Limited, England

Division of Ser. No. 540,540, Jan. 13, 1975, Pat. No. 3,983,954. This application July 31, 1975, Ser. No. 600,629
Claims priority, application United Kingdom, Jan. 17, 1974, 2156/74; Mar. 4, 1974, 9699/74
Int. Cl.² F15B 13/044; F16J 3/04
U.S. Cl. 91—47 **6 Claims**



1. An actuator device comprising:
a chamber having a relatively fixed wall and a relatively movable wall interconnected by a bellows,
a spring within said chamber to urge said bellows to an extended position,
a permanently open orifce through which said chamber is connected to atmosphere,
a cavity provided in said relatively fixed wall outside of said bellows,
an electromagnetic valve housed in said cavity and including a solenoid winding surrounding an armature movable in a direction transverse to the direction of movement of said bellows,
an aperture in said cavity which is closed by one end of the armature of said electromagnetic valve when said sole-

noid winding is de-energised, and which is opened by retraction of said armature from said aperture when said solenoid winding is energised to enable the connection to said chamber of a volume of gas at subatmospheric pressure to cause said bellows to contract against the force of said spring, and resilient means acting on the other end of said armature for urging said armature to close said aperture when said solenoid is de-energised.

4,010,675

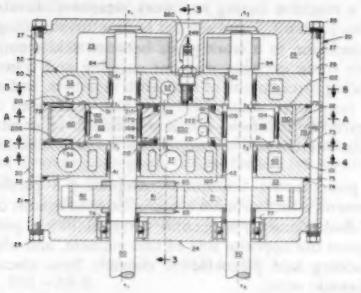
TWO STROKE MECHANISM WITH ROTARY PISTON AND CYLINDER-PISTON MOVEMENT

Marek J. Lassota, 4132 W. Roscoe St., Chicago, Ill. 60641

Continuation of Ser. No. 523,958, Nov. 14, 1974, abandoned, which is a continuation-in-part of Ser. No. 506,613, Sept. 16, 1974, abandoned, which is a continuation-in-part of Ser. No. 425,507, Dec. 17, 1973, abandoned, which is a continuation-in-part of Ser. No. 361,472, May 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 221,198, Jan. 27, 1972, abandoned. This application Sept. 4, 1975, Ser. No. 610,159

Int. Cl.² F02B *59/00*

U.S. Cl. 92—54 **42 Claims**



1. A two-stroke mechanism with rotary cylinder-piston and piston movements comprising:

a U-shaped cylinder-piston element having polyhedral body and spaced, parallel arms with parallel, flat opposing surfaces, means for rotatable mounting to an eccentric shaft and means for balancing said cylinder-piston element;

a polyhedral piston element having spaced, parallel sides adjoining said cylinder-piston flat, opposing surfaces of said spaced, parallel arms and means for rotatable mounting to a second eccentric shaft;

said cylinder-piston and piston elements forming movable walls of two variable volume chambers;

two axially spaced, stationary parallel walls adjoining opposite sides of said piston and cylinder-piston elements forming stationary walls of said first variable volume chamber;

sealing means on said cylinder-piston and said piston elements sealing said first variable volume chamber;

a peripheral wall interconnecting said spaced, stationary parallel walls to form with said spaced, stationary parallel walls the stationary walls of a second variable volume chamber;

a rotatable cylinder-piston eccentric shaft mounted in said cylinder-piston element and in said spaced, stationary parallel walls;

balancing means, balancing said cylinder-piston eccentric shaft;

a rotatable piston eccentric shaft mounted in said piston element and in said spaced, stationary parallel walls;

balancing means, balancing said piston eccentric shaft;

gearing means interconnecting said eccentric shafts so said eccentric shafts and their cylinder-piston and piston elements follow opposite and coordinated rotary paths within said second variable volume chamber;

intake means in said spaced parallel walls and in said cylinder-piston element and discharge means in said spaced parallel walls;

cooling means for cooling said spaced, parallel stationary walls and said piston and cylinder-piston elements;

lubricating means for lubricating coacting surfaces; and

lubricating means for lubricating said gearing means.

4,010,676

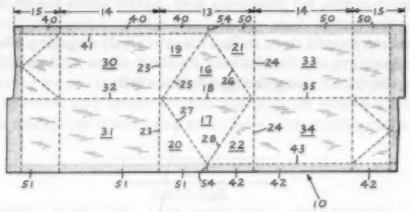
APPARATUS FOR FORMING ARTICLES SUCH AS CARTON BLANKS

Jon Arthur Eilenberg, Goshen, and George Henry Naugle, Nyack, both of N.Y., assignors to International Paper Company, New York, N.Y.

Filed Apr. 4, 1975, Ser. No. 565,128

Int. Cl.² B31B *1/44*

U.S. Cl. 93—51 R **14 Claims**



1. An apparatus for forming an article comprising:

a first article holding member containing therein a cut-out portion sloped downwardly on each side toward its center and open at opposed ends thereof;

the cut-out portion in said first article holding member comprising two downwardly sloped triangular sections joined along a first common edge which forms the bottom of the cut-out portion and the remaining two edges of each of said triangular sections being formed by two intersecting sides of said first article holding member;

a second article holding member adapted to mate with the cut-out portion of the first member, at least one of said article holding members mounted for movement toward and away from the other to mate and unmate said members;

means for moving said article holding members into and out of mating relationship;

mating article forming members which, when mated, enclose the article holding members in close fitting relationship, said article forming members mounted for movement into and out of mating relationship about said article holding members; and

means for moving said article forming members into and out of mating relationship about said article holding members.

4,010,677

APPARATUS FOR POSITIONING HEADS

Tadashi Hirakawa, and Noriyuki Hoshino, both of Mihara, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 10, 1975, Ser. No. 585,712

Claims priority, application Japan, June 14, 1974, 49-67046; June 18, 1974, 49-70363[U]

Int. Cl.² B26D *3/08*

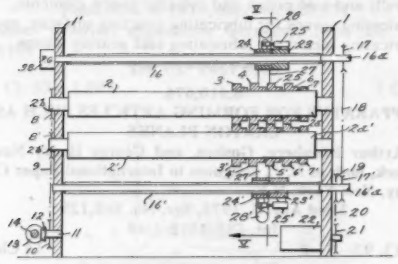
U.S. Cl. 93—58.2 R **6 Claims**

1. Apparatus for selectively positioning a plurality of heads along a shaft comprising:

an additional shaft located in parallel with said head-carrying shaft;

a master shifter and a slave shifter supported by said additional shaft;

means operatively connecting said master and slave shifters to selectively vary the spacing between said shifters along said additional shaft;



drive means for displacing said shifters along the additional shaft; and

means on said slave shifter for selectively engaging a head to position the head along its shaft when said shifters are displaced along the additional shaft.

4,010,678

METHOD AND APPARATUS FOR MAKING COMPOSITE FILTER PLUGS

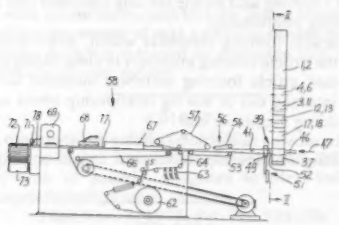
Heinz Greve, Hamburg, and Harry Sprunk, Geesthacht, both of Germany, assignors to Hauni-Werke Körber & Co., KG, Hamburg, Germany

Filed July 17, 1975, Ser. No. 596,812

Claims priority, application United Kingdom, Aug. 2, 1974, 34130/74

Int. Cl.² B65G *47/52*

U.S. Cl. 93—77 FT **24 Claims**



1. A method of making composite filter plugs for cigarettes or the like, comprising the steps of shuffling rod-like filter elements of several types to form a series of groups of assorted coaxial filter elements; moving successive groups of said series sideways; pneumatically conveying successive groups of said series lengthwise, including directing a stream of compressed gaseous fluid against one outermost filter element of each of said successive groups, and converting the pneumatically conveyed groups into a continuous line of filter elements; draping a continuous web around said line to form a continuous filter rod; and subdividing the rod into discrete filter plugs each of which contains at least a portion of at least one filter element of each of said several types.

4,010,679

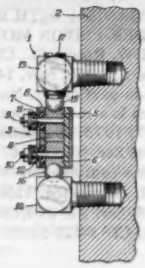
PIEZOELECTRIC TRANSDUCER SENSOR FOR USE IN A PRESS

Frank R. Dybel, Calumet City, Ill., assignor to International Measurement & Control Co., Park Forest South, Ill.

Continuation of Ser. No. 670,189, Sept. 25, 1967, abandoned. This application May 12, 1969, Ser. No. 832,542

Int. Cl.² B30B *15/28*

U.S. Cl. 100—53 **17 Claims**



1. In a machine having two work members movable with respect to each other and subject to repetitive loading forces for transmission to a work piece between said members, at least one force carrying member carrying and transmitting said loading force to one of said work members, and an electrically responsive strain sensing device positioned on said force carrying member, the improvement in combination therewith wherein said sensing device is a piezoelectric transducer,

said piezoelectric transducer comprising a piezoelectric element, a first terminal block positioned against one face of said element, a second terminal block positioned against the opposite side of said element, and means for shielding said piezoelectric element from electric and magnetic noise,

a mounting means attached to and extending from the force carrying member, said mounting means comprising a first and a second bracket spaced from each other, one end of each bracket being attached to said force carrying member, the other ends of said brackets having contact means for engagement with said terminal blocks, at least one of said contact means being electrically nonconductive,

said piezoelectric transducer being positioned and clamped between the said other ends of the brackets with the contact means of said first bracket engaging said first terminal block and the contact means of said second bracket engaging said second terminal block so that the clamping force of the brackets is substantially parallel to and aligned with a line normal to the interfaces between said element and terminal blocks, and

an energized electronic circuit electrically connected to the terminal blocks which circuit is predeterminedly activated by the output signal of the piezoelectric transducers when stressed during a work cycle of the machine to activate a machine monitoring means.

4,010,680

COTTON PACKAGING METHOD AND APPARATUS

George S. Buck, Jr., and Roger Russell, both of Memphis, Tenn., assignors to Cotton Incorporated, Raleigh, N.C.

Division of Ser. No. 532,008, Dec. 12, 1974, Pat. No. 3,948,021. This application Jan. 21, 1976, Ser. No. 650,980

Int. Cl.² B30B *3/00*

U.S. Cl. 100—152 **3 Claims**

1. Cotton packaging apparatus comprising:

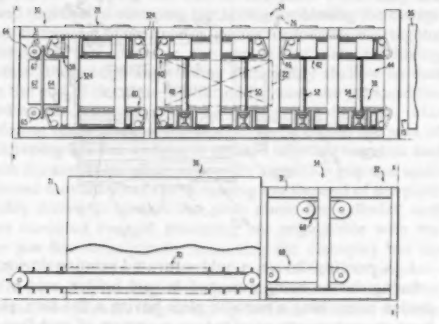
a press section including at least one transient compression and conveying surface;

chain means for moving said compression and conveying surface;

drive means for selectively oscillating said chain means, said drive means comprising:

a reciprocable rod means,

chain clutching means carried by said rod means and reciprocable therewith, said chain clutching means including:



pivotable latch means movable between chain engaged and disengaged positions, and

latch control means for selectively pivoting said latch means between said positions.

4,010,681

CYLINDRICAL ARTICLE PRINTER

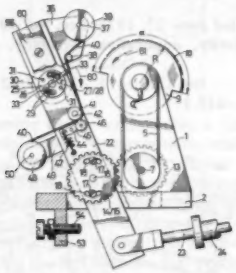
Hermann Hamberger, Rielasingen, and Erwin Ulrich, Talheim, both of Germany, assignors to Gesellschaft fur Elektro-Feintechnik mbH & Co. KG, Germany

Filed Jan. 29, 1975, Ser. No. 545,180

Claims priority, application Germany, Feb. 8, 1974, 2405944

Int. Cl.² B41F *17/08*

U.S. Cl. 101—38 R **1 Claim**



1. A printing device for printing cylindrical objects, such as wheels, drums, etc. comprising a printing stereotype having a cylindrical arcuate printer surface, first mounting means rotatably supporting said stereotype, a workpiece holder, second mounting means rotatably supporting said workpiece holder, movable support means movably supporting said second mounting means to move said workpiece holder toward and away from said printing stereotype for moving the workpiece into and out of engagement with the printer surface, means for applying ink to said printer surface, and positive gear drive means connected to rotate said stereotype and its printer surface and to rotate said workpiece holder at the same speeds but opposite directions of rotation and to hold said printer surface and said workpiece holder in the same relative angular positions during movement of said second mounting means for engagement and disengagement of the workpiece and said printing surface whereby engagement will always take place at a predetermined point on the cylindrical circumference of the workpiece and the surfaces of the workpiece and said printing stereotype will move smoothly together in contact during printing, said means for applying ink to said printer surface comprising an inking ribbon, means guiding said ribbon for movement between said workpiece and said printing surface, and inking ribbon drive means connected to said ribbon and to said positive gear drive means for rotation the ribbon in timed relationship to the rotation of the workpiece, said ribbon being disposed between said workpiece and said printer surface and being movable with said workpiece rotation and said printer surface rotation during printing of said workpiece, said positive gear drive means comprising a printing stereotype shaft having a driven gear pulley thereon, a drive shaft having a drive gear pulley thereon, a gear belt interconnecting said drive gear pulley to said driven pulley, said second support means comprising a pivotal support lever pivotally mounted adjacent said stereotype printer and comprising said movable support means carrying said workpiece holder, a transmission shaft rotatably supported on said lever and geared to said drive shaft, a transmission gear pulley affixed to said transmission shaft for rotation therewith, a workpiece pulley affixed to said workpiece shaft for rotation therewith, a workpiece drive gear belt engaged over said transmission shaft pulley and said workpiece shaft pulley to rotate said workpiece support, said workpiece support comprising a disc member, said disc member having means for adjustably angularly positioning a workpiece thereon, and means to shift said support lever for shifting the workpiece toward and away from said printing surface.

4,010,682

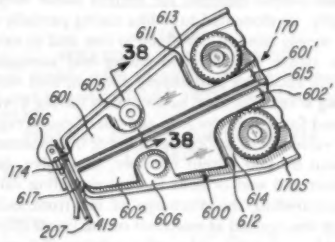
LABEL PRINTING AND APPLYING APPARATUS

Paul H. Hamisch, Jr., Franklin, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Filed May 14, 1975, Ser. No. 577,376

Int. Cl.² B41K *1/10*; B41F *1/02*

U.S. Cl. 101—288 **10 Claims**

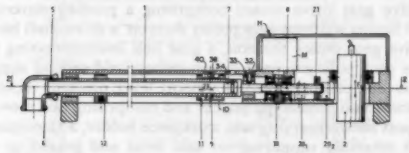


1. Hand-held apparatus for printing and applying pressure sensitive labels carried on a web of supporting material, comprising: a frame having a handle, a platen stationarily mounted to the frame, a print head movably mounted to the frame and cooperable with the platen to make a printing impression on a label, the print head having at least one row of side-by-side selectively settable printing members, a delaminator disposed downstream of the platen for delaminating printed labels from the web, an applicator disposed downstream of the delaminator for applying labels to an article to be labeled, a manually operable actuator disposed at the handle, means driven by the actuator for driving the print head toward and away from the platen by exerting an unbalanced driving force on one side of the print head, means driven by the actuator for advancing the web to between the print head and the platen and thereafter to the delaminator in label applying position by the applicator, and means including a weight carried by the print head and effective when the print head and the platen are in cooperation for dampening the rebound of the print head to prevent the print head from making a second printing impression on the label.

4,010,683
LIQUID LEVEL CONTROL

Gerard Edouard Lambert, Saint-Cloud, and Roger Begis, Chaville, both of France, assignors to Societe Seveg Etudes Equipments Graphiques, Sevres, France

Continuation-in-part of Ser. No. 550,346, Feb. 18, 1975, abandoned. This application May 14, 1976, Ser. No. 686,379
Claims priority, application France, Feb. 19, 1974, 74.05490
Int. Cl.² B41F 31/08
U.S. Cl. 101—366 6 Claims



1. In an ink supply and ink level control device for mounting on an ink fountain of a printing machine, the combination comprising:

a control and power head having an output member reciprocably mounted in and extending from said head, a reversible drive motor connected to produce limited linear displacement in one direction or the other of said output member, a pair of spaced limit switches mounted for operation in response to movement of said output member to the limits, respectively, of its linear displacement, and an electronic proximity detector projecting from said head toward the surface of ink in said ink fountain to sense the relative proximity of said surface of said ink; and

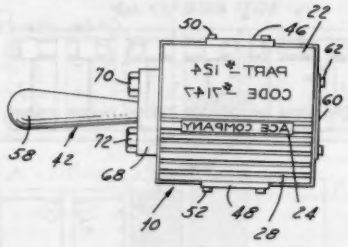
an ink supply conduit and casing assembly carried by said control and power head, said assembly including a conduit for receiving ink from a source of ink and connected to said output member for limited linear displacement thereby, an elongated tube-like casing partially enclosing said supply conduit and fixed at one end to said head, a valve sleeve fixed in said casing and surrounding and slidably receiving said supply conduit, said valve sleeve having a radial orifice, said conduit having a wall orifice located for movement into and out of radial registry with said valve sleeve orifice upon linear displacement of said conduit by said output member, said valve sleeve, said conduit and said orifices therein providing valve means for controlling the discharge of ink from said conduit which are opened at one limit of the linear displacement of said conduit by said output member and are closed at the other limit of its linear displacement thereby,

said control and power head further having automatic control means for maintaining a predetermined level of ink in the ink fountain comprising electrical circuit means connecting said proximity detector to activate said motor responsive to the level of ink in the ink fountain falling below a predetermined level to displace said output member and conduit in one linear direction for opening said valve means, and connecting one of said limit switches to deactivate said motor upon movement of said conduit to its limit in said one linear direction for maintaining said valve means opened for supplying ink to the ink fountain, and electrical circuit means connecting said proximity detector to activate said motor responsive to the level of ink in the ink fountain at the predetermined level to displace said output member linearly in the other direction for closing said valve means, and connecting the other of said limit switches to deactivate said motor upon movement of said conduit to its limit in said other direction for maintaining said valve means closed and terminating the supply of ink to the ink fountain.

4,010,684
PRINTING DEVICE

Raymond J. LaPointe, Jr., Bloomfield Hills, Mich., assignor to Detroit Ball Bearing Company, Detroit, Mich.

Filed Sept. 22, 1975, Ser. No. 615,804
Int. Cl.² B41F 27/02
U.S. Cl. 101—382 MV 1 Claim

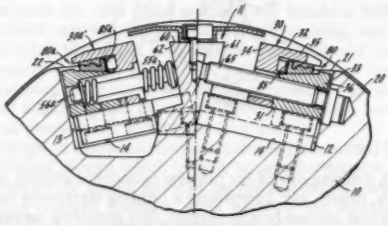


1. A printing device, a holder for said printing device, said printing device being mounted in said holder, said printing device comprising a metallic plate having a flat face, permanent magnet means provided on a portion of said face, said permanent magnet means comprising at least three permanent magnets, a plurality of spaced apart recesses provided on said portion of said flat face, each of said magents being received in one of said recesses, a flat magnetic plate releasably retained on said flat face by said magnet means, said flat metallic plate having protruding indicia stamped thereon, a plurality of parallel spaced apart grooves provided in the remaining portion of said flat face, printing type releasably received in said grooves, said printing type having a generally U-shaped configuration including a pair of leg elements spaced apart by an interconnecting web portion, indicia type protruding from said web portion, said leg elements extending into adjacent grooves.

4,010,685
PRINTING PLATE CLAMPING DEVICE

Karl Trageser, Rodenbach II Krs. Hanau, Germany, assignor to Roland Offsetmaschinenfabrik Faber & Schleicher AG, Germany

Filed June 27, 1975, Ser. No. 591,029
Claims priority, application Germany, June 28, 1974, 2431133
Int. Cl.² B41F 27/06, 7/22
U.S. Cl. 101—415.1 6 Claims



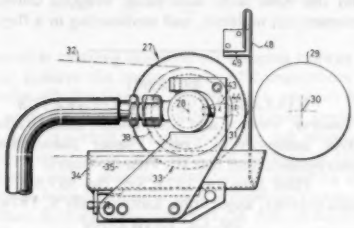
1. In a clamping and tensioning mechanism for mounting a thin flexible printing plate on the surface of a printing cylinder having a longitudinal gap formed therein, the combination comprising a mounting bar extending longitudinally in the gap and having means for guiding the same for broadwise movement peripherally of the cylinder, said mounting bar having a longitudinal groove formed therein oriented in the direction of the end of the plate, the groove being of dovetail cross section presenting spaced opposed smooth wedging surfaces defining a wedge angle between them, a two piece clamping bar extending longitudinally in the groove, the two piece clamping bar being of overall matching wedge cross section with said

groove and formed of mating upper and lower jaws having smooth outer surfaces angled to engage the wedging surfaces and separable one from the other to permit the end of a plate to be shoved between them when contained in the broader region of the groove and presenting opposed gripping surfaces specially shaped to frictionally engage and deform the end of the plate for gripping the end of the plate when they are pressed together, a clamping bar spring for biasing the clamping bar outwardly of the groove, means for forcibly moving the mounting bar broadwise in the gap in the plate tensioning direction, the wedge angle being sufficiently shallow so that when the end of the plate is inserted between the jaws and the mounting bar is moved in the plate tensioning direction, relative sliding takes place at the smooth surfaces and the jaws of the clamping bar are wedgingly pressed together to retain and deform the end of the plate to provide a positive grip and upon continued movement of the mounting bar the end of the plate is bodily drawn to tension the plate about the cylinder, and means mounted on said mounting bar engageable with the upper jaw for subsequently retracting the clamping bar inwardly of the groove for disengagement of the wedging surfaces to permit spreading of the jaws and release of the end of the plate, the jaws having abutting surfaces thereon to keep the jaws in register with one another in all positions thereof.

4,010,686
MEANS FOR APPLYING LIQUID TO A RELATIVELY MOVING SURFACE

John William Harris, Kettering, England, assignor to Timsons Limited, Kettering, England

Filed Apr. 7, 1975, Ser. No. 565,533
Int. Cl.² B41L *23/00*
U.S. Cl. 101—148 **7 Claims**



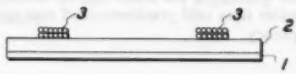
1. In a dampening device comprising, a carrier member including a foraminous wall for temporarily retaining dampening liquid, means for supporting the carrier member with portions of said wall disposed respectively at a pick-up station and at a delivery station spaced therefrom, drive means for cyclically moving the carrier member to move said wall along a path through the pick-up station and the delivery station, means for supplying the liquid to the wall portion at the pick-up station, and means for directing a flow of gas onto one face of the wall portion at the delivery station; the improvement wherein:

a. said foraminous wall incorporates apertures and is of cylindrical form and comprises
   i. an inner foraminous element,
   ii. an outer foraminous element embracing and supported by said inner foraminous element,
b. the apertures of said outer element are of a sufficiently small size to ensure that they will all reliably be spanned by a film of the liquid when travelling between the pick-up station and the delivery station, and thereby ensure that a predetermined quantity of the liquid will be transported to the delivery station in each cycle of movement of the carrier member,
c. the minimum aperture size of said inner element is sufficiently large to ensure that the apertures thereof reliably are free from spanning by a film of the liquid when travelling from the pick-up station to the delivery station,
d. the means for directing the flow of gas provides for gas flow
   i. impinging on the wall portion at the station only between predetermined boundaries extending transversely of the direction of movement of this wall portion and spaced from each other,
   ii. at a velocity sufficient reliably to dislodge the liquid in each apertures between said boundaries and project the liquid in the form of a spray,
e. the drive means provides for rotation of the carrier member about the axis of its cylindrical wall.

4,010,687
PLANOGRAPHIC PRINTING MASTER

Richard L. Schank, Webster, N.Y., and Richard G. Crystal, Los Altos, Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 13, 1973, Ser. No. 351,110
Int. Cl.² B41H *1/14*; B41C *1/10*
U.S. Cl. 101—453 **35 Claims**



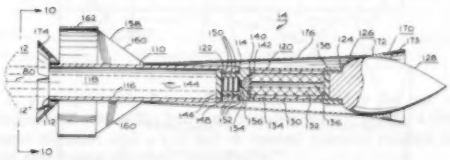
1. A method of producing a printing master comprising:

a. providing a suitable substrate;
b. coating said substrate with a layer of an ink releasable material selected from the group consisting of silicone elastomers and heterophase polymeric compositions having a silicone phase;
c. depositing a particulate image pattern on said layer, said image pattern comprising an ink receptive heterophase polymeric composition having a silicone phase; and
d. fusing said image pattern on said layer whereby said image pattern provides ink receptive areas.

4,010,688
WEAPON ARRANGEMENT

Matthew S. Smith, 4400 Sarah St., No. 29, Burbank, Calif. 91505, and Ernest A. Filippi, 18776 Kenya St., Northridge, Calif. 91324

Filed Nov. 17, 1972, Ser. No. 307,444
Int. Cl.² F42B *11/42*
U.S. Cl. 102—65.2 **2 Claims**



1. A rocket boosted warhead round having a center of gravity, a center of pressure and a predetermined non-spinning yawing frequency, for launching from a launcher of the type adapted to fire a blank cartridge and having a barrel portion through which the blank cartridge fires and comprising, in combination:

a tubular tailpipe means having an aft end, a forward end, and internal walls defining a tubular passageway, and said tubular passageway at said aft end adapted to slidingly fit onto the end of the launcher barrel;
a rocket motor having an aft end coupled to said forward end of said tailpipe, and a forward end, and comprising a solid propellant rocket grain;
a warhead coupled to said forward end of said rocket motor, and said warhead having a predetermined ogive external configuration;
a forward drag shroud means detachably mountable adja-

cent said warhead for providing a first predetermined drag configuration having a drag greater than the drag of the round free of said forward drag shroud to decrease the range thereof, and comprising:

a base section detachably mountable adjacent said warhead for providing a first drag characteristic greater than the drag characteristic of the round free of said forward drag shroud; and

an outer section detachably mountable on said base section for providing a second drag characteristic greater than said first drag characteristic;

a delay means in said rocket motor for providing a predetermined delay to full thrust of said rocket motor,

whereby firing a blank cartridge in the launcher provided hot gaseous products of combustion for launching the rocket boosted warhead round from the launcher and ignition of the rocket motor, and

aero-gyro stabilization means coupled to said aft end of said tubular tailpipe for spinning said round to provide aero-gyro stability, said aero-gyro stability comprising wherein said center of pressure is aft of said center of gravity and the round is spinning at a rate at least one order of magnitude greater than said predetermined non-spinning yawing frequency.

4,010,689

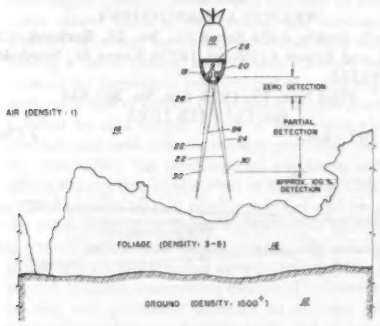
APPARATUS FOR SENSING TARGET DISTANCE

Irving I. Sochard, Chevy Chase; Marcella C. Petree, Silver Spring; Wallace N. Knutsen, Silver Spring; Frederick E. Warnock, Silver Spring, and Edward A. White, Jr., Beltsville, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 23, 1970, Ser. No. 97,477

Int. Cl.² F42C *13/02, 13/04, 13/00*

U.S. Cl. 102—70.2 P **2 Claims**



1. A distance sensing device comprising

a radiation source for producing a radiation signal;

a first radiation shield for transmitting said radiation signal to a target in a first predetermined path;

a radiation detector having a second radiation shield for restricting detection of backscatter within a second predetermined path, said first and second predetermined paths intersecting to define zones of detection;

means for detecting a weighted portion of the backscatter of said transmitted radiation signal within each zone of detection, said weighted detected backscatter corresponding to the absolute backscatter of said transmitted signal, and

means for providing an actuation signal when said detected backscatter exceeds a predetermined value corresponding to a predetermined distance to said target.

4,010,690

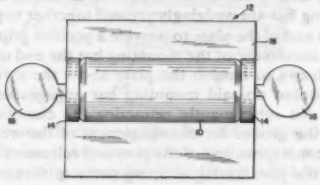
MEANS FOR AND METHOD OF PROVIDING A FIRE PROTECTION FOR A CASELESS AMMUNITION

Robert A. Cocozella, Chelmsford; Florindo F. Dal Pan, Nabnasset; Thomas M. Finelli, North Andover, all of Mass., and Duane M. Patterson, Nashua, N.H., assignors to Avco Corporation, Cincinnati, Ohio

Filed Apr. 30, 1973, Ser. No. 355,807

Int. Cl.² F42B *37/00*

U.S. Cl. 102—97 **2 Claims**



1. A fire protecting means for a caseless ammunition round comprising:

a structural disc having the same diameter as the round positioned adjacent to each end of the round;

a foil wrapper for enclosing at least the cylindrical surface of the round, said foil wrapper being made from heat conducting material to form a heat sink; and

an outer wrapper encircling the round, the structural disc and the heat sink, said outer wrapper comprising an intumescent material, and terminating in a flap.

4,010,691

BALLAST LEVELING APPARATUS

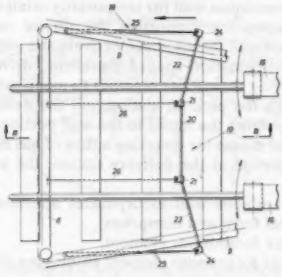
Josef Theurer, Vienna, and Karl Folser, Linz-Urfahr, both of Austria, assignors to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Filed June 18, 1975, Ser. No. 587,892

Claims priority, application Austria, July 5, 1974, 5580/74

Int. Cl.² E01B *27/02*

U.S. Cl. 104—7 A **6 Claims**



1. A ballast leveling apparatus mounted on a machine for treating ballast, the machine being adapted to move in a working direction on a track including ties resting on a ballast bed and the machine comprising a ballast excavating means extending transversely of, and underneath, the track for removing ballast from the ballast bed, a guide frame for the ballast excavating means, a ballast cleaning screen for separating the removed ballast into cleaned ballast and rubble, conveyor means for conveying the removed ballast from the ballast excavating means to the screen and for conveying the cleaned ballast to underneath the track behind the excavating means

in the working direction, the ballast leveling apparatus being mounted behind the ballast excavating means for leveling the cleaned ballast and consisting of an arrangement of bars extending substantially transversely of the track and over the entire length of the track ties, the arrangement consisting of a central one of rod-like bars extending substantially parallel to the ties and two outer ones of the bars, the ends of the central bar being pivotally joined to respective inner ends of the outer bars, and elongated guide elements freely movably connecting the outer ends of the outer bars and the joined ends of the central and outer bars to the guide frame.

4,010,692

PROCESS FOR TAMPING RAILWAY TRACKS AND A MOVABLE MACHINE FOR EFFECTING THE PROCESS

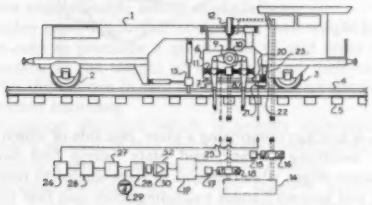
Pierre Goel, Vaud, Switzerland, assignor to Matisa Materiel Industries S.A., Vaud, Switzerland

Filed Dec. 19, 1975, Ser. No. 642,353

Claims priority, application Switzerland, Jan. 17, 1975, 568/75

Int. Cl.² E01B *27/16*

U.S. Cl. 104—12 **11 Claims**



6. A movable tamping machine for tamping railway tracks in order to achieve the same degree of compactness of the ballast under all the sleepers of the track tamped by said machine, said machine comprising a tamping device with vibratory tamping tools, a control device for stopping the compacting operation of said tools and adapted to receive a control signal, and a measurement circuit including pick-up means for measuring the amplitude of vibrations retransmitted by the ballast across the sleepers and the rails of the track to a part of the machine which is maintained in non-elastic connection with at least one rail of the track, said pick-up being rigidly fixed to said part of said machine, and a computer adapted to emit said control signal to stop the compacting operation of said tools when a predetermined value (K) of increase in amplitude of the vibrations measured by said pick-up means is reached, this value being characteristic of the approach of the desired maximal degree of compactness of the treated ballast.

4,010,693

TRACKED AIR CUSHION VEHICLE

Denys Stanley Bliss, Cambridge, England, assignor to Bliss Pendair Limited, London, England

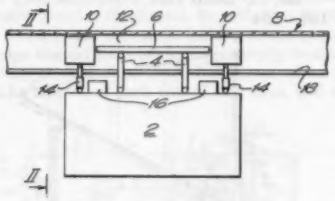
Filed Apr. 30, 1975, Ser. No. 573,304

Claims priority, application United Kingdom, May 8, 1974, 20244/74

Int. Cl.² B61B *13/08*

U.S. Cl. 104—23 FS **25 Claims**

6. A tracked air cushion vehicle comprising a vehicle body; a lift platform from which said vehicle body is suspended; end bogies provided at each end of said lift platform, said lift platform and said end bogies being adapted to run within an inverted channel section track including side and top walls so as to define a chamber which can be maintained at subatmospheric pressure; means connected to said chamber for providing said subatmospheric pressure; respective strut means coupled between each of said end bogies and said vehicle body, each of said strut means including means for biasing said end bogies towards the top wall of said track with a force equal to at least a substantial portion of the weight of the respective end bogie; link means which enable the respective bogie to swivel relative to the platform; pivotal means connected between each link means and the respective bogie, the rotational axis of the pivotal means defining the roll axis of the vehicle; and means responsive to vertical movement of said platform relative to said track for regulating said subatmospheric pressure.



4,010,694

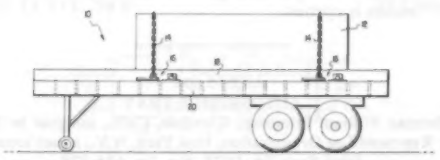
LOAD TIE-DOWN AND ANCHOR SYSTEM

Gerald R. Mooney, 3080 Eldogor Lane, New Castle, Pa. 16105, and Louis A. Mooney, 1002 Ryan Ave., New Castle, Pa. 16101

Filed May 21, 1975, Ser. No. 579,621

Int. Cl.² B60P *7/10*, *7/16*; B61D *45/00*, *49/00*

U.S. Cl. 105—482 **15 Claims**



1. A positionally adjustable anchor assembly for use in conjunction with a flat bed load carrying vehicle having a side frame member and a rub rail in spaced, parallel relation to said side frame member, comprising:

a plurality of support plates located between and secured to said side frame member and said rub rail in a uniformly spaced, linear array, said plates being parallel to one another and each plate having an opening therethrough and a slot extending from said opening to an edge of said plate, the width of said slot being less than the maximum width of said opening;

a bar slidably received in said openings of said plates, the width of said bar being greater than the width of said slot and the length thereof being greater than the separation between adjacent ones of said support plates;

anchor means secured to said bar; and

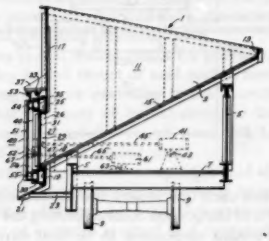
locking means connected to said bar and movable between a first position preventing sliding movement of said bar in said support plates openings and a second position permitting sliding movement of said bar in said support plate openings.

4,010,695

COKE QUENCHING CAR CLOSURE MECHANISM

Anthony F. Mantione, Bethlehem, Pa., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Division of Ser. No. 516,043, Oct. 18, 1974, Pat. No. 3,924,543. This application May 8, 1975, Ser. No. 575,843
Int. Cl.² B61D *3/04, 3/16, 7/08, 9/12*
U.S. Cl. 105—254 **4 Claims**



1. In a coke quench car having a coke basket with a front wall, and a discharge opening in said front wall, the improvement comprising:

a. channel bar means adjacent the perimeter of said discharge opening;

b. grate means at said discharge opening movable between an open and closed position for discharging liquid and retaining coke in said basket when in the closed position;

i. said grate means including a first contact member means adjacent the edges of said grate means for contacting said channel bar means in substantially liquid-tight fashion;

c. closure means adjacant said grate means;

i. said closure means including a second contact member means adjacent the edges of said closure means for contacting said first contact member means in substantially liquid-tight fashion for retaining coke plus liquid in said basket;

d. first means for opening and closing said closure means; and

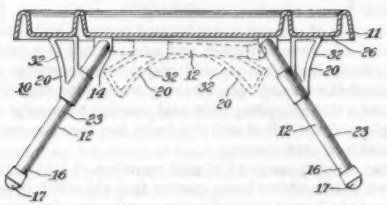
e. second means for opening and closing said grate means operated to open said grate means when said closure means is opened.

4,010,696

AUTOMOBILE TRAY

Herman William Priesman, Glendale, Calif., assignor to The Raymond Lee Organization, New York, N.Y., a part interest

Filed Sept. 24, 1975, Ser. No. 616,278
Int. Cl.² A47B *85/00*
U.S. Cl. 108—19 **2 Claims**



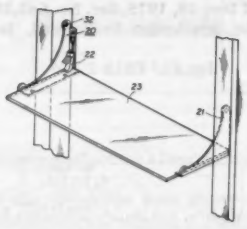
1. A tray assembly adapted for mounting over a transmission hump in the floor of a vehicle comprising a shaped panel member that serves as a tray, pairs of bearing members fitted to the underside of said panel member, a plurality of pairs of legs, each pair of legs being interconnected by a mid-section to form a C-section, each of such C-sections being rotatably fastened to a pair of said bearing members, a bracket having a concave edge fastened to each leg of each C-section, said bracket shaped to engage the underside of said panel when the leg is rotated to a fully extended position, and located to hold the C-sections when fully extended in a plane which is at an obtuse angle to the plane of the tray, taken from a mid-section of the tray.

4,010,697

SHELF BRACKET ASSEMBLY AND BRACKET FOR SAID ASSEMBLY

Ruediger Einhorn, Katonah, N.Y., assignor to Coats & Clark, Inc., Stamford, Conn.

Filed Jan. 23, 1976, Ser. No. 651,951
Int. Cl.² A47B *57/00*
U.S. Cl. 108—93 **19 Claims**



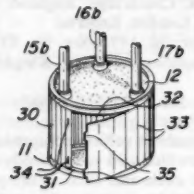
1. A bracket comprising a plate, one side of which defines a first mounting surface, said plate having first and second adjacent edges which extend at right angles to one another, first and second flanges extending from said first and second edges respectively, in a direction away from said first mounting surface, said first and second flanges defining second and third mounting surfaces respectively extending to said first and second edges respectively, a pair of mounting apertures extending through at least one of said flanges, a mounting hole in said plate adjacent the junction of said first and second edges, said flanges extending given distances along said first and second edges respectively, with said first flange extending to said junction, said plate extending beyond said flanges along said first and second edges in the direction away from said junction, and a pair of first and second holes in said plate adjacent said first and second edges respectively, and beyond said first and second flanges, in the direction away from said junction.

4,010,698

MULTI-SHELVED DISPLAY ASSEMBLY

Ronald H. Taub, Highland Park, Ill., assignor to Taub Family Trust U/A dated 9/1/67, Chicago, Ill.

Filed July 29, 1974, Ser. No. 492,513
Int. Cl.² A47B *3/00*
U.S. Cl. 108—111 **3 Claims**



1. In a multi-shelved collapsible display assembly including a base, a standard extending upwardly from said base, and an array of shelves spaced longitudinally along the length of said

standard and carried thereby, said shelves being formed with holes extending transversely thereof to receive portions of the standard therethrough,

said base and a lowermost shelf of said array of shelves being generally coextensive, coaxial, and each including a generally circular perimetric edge portion,

said display assembly further comprising a sheetlike display panel adapted to wrap around the display assembly between the base and the lowermost shelf and to bear graphic indicia for advertisement of any articles carried by the shelves of the display assembly, said display panel being formed with a slit extending longitudinally therethrough and further comprising integral tab means, said tab means being adapted to seat within the slit to form a cylindrical display sign surrounding the display assembly between the base and the lowermost shelf,

said base being formed with a groove opening upwardly and extending around an upper perimetric edge portion thereof,

and said lowermost shelf being formed with a groove opening downwardly and extending around a lower perimetric edge portion thereof,

said cylindrical display panel being sized to extend longitudinally between the grooves in the base and in the lowermost shelf, thereby to stabilize the display assembly against objectionable lateral displacement,

said display assembly further comprising shelf weight isolating means to preclude a given shelf of said array from subjection to the weight of any shelf and shelf-carried articles thereabove in said array, said shelf weight isolating means including

a shelf-support standard which is lineally segmented to provide a series of in-line pole segments interconnectable to provide a unitary integrated pole structure,

said standard including a first pole segment defining a socket, a weight support end wall extending transversely of said socket, and a second pole segment adjacent the first pole segment and including a projection adapted to seat within the socket of the first pole segment and to abut said end wall, said projection, said socket, and said end wall comprising in combination coupling means and weight bearing means operative to transfer to each segment of said pole structure the full weight of each segment thereabove, and

pole carried shelf support means to support the shelves in place on the standard in zones adjacent junctures of intercoupled consecutive segments of the pole structure, said support means comprising an annular weight bearing ledge encircling a longitudinal axis of said pole structure and normal thereto, and annular shoulder means on said shelves encircling and concentric with said holes formed therethrough;

whereby said shoulder means bears downwardly upon said ledge to support said shelves and shelf-carried articles on the pole structure, to obviate imposition on any shelf of the weight of the standard and the standard-carried shelves thereabove.

4,010,699

SELF-ERECTING FOLDING STEP STOOL

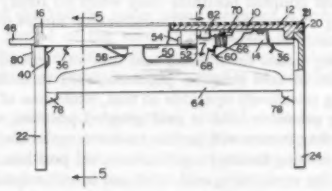
Eino E. Lakso, Box 257, Fitchburg, Mass. 01420

Continuation-in-part of Ser. No. 276,744, July 31, 1972, Pat. No. 3,805,711. This application Jan. 11, 1974, Ser. No. 432,661

Int. Cl.² A47B *3/00*

U.S. Cl. 108—133 **4 Claims**

1. A self-erecting article comprising a top member, legs pivotally associated with said top member at the respective end portions thereof, a handle adjacent each leg, said legs having erect positions generally at right angles with respect to the top member and folded positions generally parallel thereto, a strut having a main body portion, means pivoting said strut to said top member at the underside thereof adjacent the center of the top member on an axis at right angles to the pivot axes of said legs, and means biassing said main body portion of the strut to extended condition outwardly from the top member, said strut main body portion having a length equal to the distance between the legs when extended, interengaging automatic locking means between the ends of the strut main body portion and each of said legs for holding said legs generally fixed with respect to said strut in extended condition thereof, said automatic locking means comprising a pair of wedge shaped locks projecting laterally from the main body portion of said strut there being one of said wedge shaped locks located at each end of said strut, and a pair of



locking blocks one locking block at said pair being rigidly mounted on the inside surface of one of said legs adjacent to said strut in the erected condition thereof and the other locking block being similarly mounted on the other leg, each of said locking blocks having a wedge shaped opening facing said strut for receiving one of said wedge shaped locks when said strut is pivoted to its extended condition, and yielding means lightly holding the legs superimposed on the strut when folded, said yielding means having a strength thereof allowing separation of the legs upon a slight downward shake applied to the top member while grasping the handles, thus bringing the legs into an erected and locked condition.

4,010,700

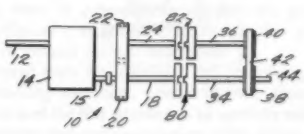
PROGRAM CONTROLLED POWER TRANSMISSION

Harley E. Webb, Ooltewah, Tenn., assignor to South-Co Machinery Company, Inc., Chattanooga, Tenn.

Filed Feb. 9, 1976, Ser. No. 656,589

Int. Cl.² D05C *15/02*

U.S. Cl. 112—79 R **16 Claims**



1. An apparatus for controlling a driven rotatable member simultaneously with respect to its direction of rotation and the period of rotation in a selected direction comprising:

drive means for continuously delivering rotary power at a selected speed,

transmission means for receiving said rotary power from said drive means and transmitting intermittently said rotary power in selected increments of rotation in a selected direction,

a first rotatable member connected to said transmission means for rotation thereby.

a second rotatable member,

means connecting said first and second rotatable members for rotation in opposite directions,

a third and a fourth member each mounted for rotation in either a clockwise or a counter-clockwise direction,

first coupling means for coupling said first and third members so that rotation of said first member will be transmitted to said third member,

second coupling means for coupling said second and fourth

members so that rotation of said second member will be transmitted to said fourth member,

said first and second coupling means each being movable independently of each other between a coupled and an uncoupled position relative to said first and third and said second and fourth members, respectively,

said first and said second coupling means each having biasing means for constantly urging said respective coupling means toward said uncoupled positions,

means for moving said first and second coupling means to said coupled positions against the urging of said biasing means in timed relationship with said transmission means so that said first and second coupling means will both be in said coupled positions only when no rotary power is being transmitted by said transmission means to said first rotatable member,

retaining means for holding said first and second coupling means in said coupled positions, said retaining means being selectively operable so that, while one of said coupling means is held in said coupled position, said other coupling means will be free to move under the urging of said biasing means to said uncoupled position, and

means for connecting said third and fourth rotatable members for rotation in the same direction so that, when said first coupling means is held in said coupled position, said third rotatable member will be rotated in the same direction as said first rotatable member and, when said second coupling means is held in said coupled position, said third rotatable member will be rotated in the same direction as said second rotatable member.

4,010,701

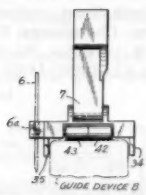
SEWING MACHINE ACCESSORY

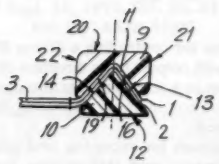
Raymond Helfont, 152-28 Jewel Ave., Flushing, N.Y. 11367

Filed Oct. 30, 1975, Ser. No. 627,143

Int. Cl.³ D05B *21/00*; D05C *9/04*

U.S. Cl. 112—121.12 **10 Claims**





1. A sewing machine accessory for sewing at least two layers of material to each other in an irregular pattern with a sewing machine having a plate with a supporting surface having a hole formed therein, a feeder having a high friction surface positioned in the hole and having an intermittent motion relative to the surface of the plate, a needle and a foot device for pressing material to be sewn onto the supporting surface of the plate and guiding the needle through such material in a selected pattern, said sewing machine accessory comprising

independent guide means positionable on the supporting surface of the plate and in intermittent contact with the feeder of a sewing machine for guiding the sewn material through an irregular pattern, said guide means comprising a pair of complementary jig devices shaped to fit in substantial juxtaposition with layers of material to be sewn to each other positioned between said jig devices, said jig devices having substantially the same irregular configuration and complementary cross-sectional areas, one of the pair of complementary jig devices comprising a frame of substantially rigid material having a cross-sectional area of predetermined geometric configuration and being utilized as the bottom one of said jig devices and the other of said pair of complementary jig devices comprising substantially rigid material having a cross-sectional area of predetermined configuration with a channel formed therein of substantially the same configuration and dimensions as the cross-sectional area of said one of said pair of complementary jig devices and being utilized as the top one of said jig devices, and clamping means for releasably clamping the jig devices in substantial juxtaposition with the material to be sewn positioned therebetween; and

guide member means extending from the foot device of a sewing machine for maintaining the guide means in a predetermined position relative to the needle of the machine while said guide means is moved between the foot device and the supporting surface of the feeder of the machine through the entire duration of said guide means.

4,010,702

AUTOMATIC THREADING DEVICE FOR SEWING MACHINES

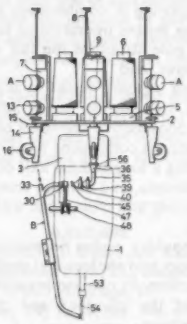
Toshio Miyamoto, 17-27, 2-chome Himezato, Nishiyodogawa, Osaka, Japan

Filed Sept. 3, 1975, Ser. No. 610,058

Claims priority, application Japan, Oct. 8, 1974, 49-116654; Feb. 6, 1975, 50-17055; Sept. 3, 1974, 49-102192; Sept. 3, 1974, 49-102193

Int. Cl.³ D05B *87/02*

U.S. Cl. 112—225 **5 Claims**



1. A threading device for a sewing machine to selectively feed a thread from one of several bobbins through the eye (**55**) of a sewing needle (**54**) in a needle holder (**53**) at the working end of an arm (**1**) comprising in combination:

a. a moveable table (**2**) disposed above said arm (**1**) having a plurality of bobbin holders (**5**) for supporting bobbins with thread (**9**) thereon for selectively moving said bobbins to a feeding station;

b. guide means (**14, 16**) below each bobbin to guide and feed thread from the bobbin downwards;

c. a suction pipe (**35**) at said feeding station with an aperture disposed under said guide means (**14**), an elongated guide pipe fed by said suction pipe (**35**) and blast and suction means coupled to said guide pipe to propel a thread therethrough, said guide pipe having an outlet (**34**) disposed in the adjacent said eye (**55**);

d. a slidable rod (**50**) juxtoposed opposite said eye (**35**)

having wire means and grasp means at the outer end thereof so adapted and disposed that said grasp means can penetrate said eye, grasp said thread and pull it through the needle eye; and,

e. means for actuating said slidable rod.

4,010,703

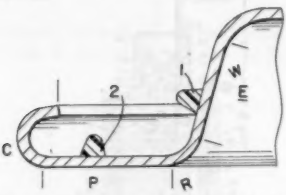
END LINING WITH HOT MELT

John Clements Spiekermann, III, Justice; David J. Rosbe, Hickory Hills; Edmund M. Kulesa, South Holland; James Kulik, Chicago, and David F. Brasel, Worth, all of Ill., assignors to The Continental Group, Inc., New York, N.Y.

Filed Dec. 17, 1975, Ser. No. 641,417

Int. Cl.² B21D *51/30*

U.S. Cl. 113—120 Y **11 Claims**



1. In a container having an end panel joined to a body by a double lapped seam, an improved method of providing a sealant in said seam comprising the steps of:

providing an end panel having a peripheral channel portion,

depositing a quantity of hot melt material in said channel portion in a first position,

heating said deposited material causing the same to reflow, to a second preferred position, and

double seaming said end panel with the reflowed material to said body.

4,010,704

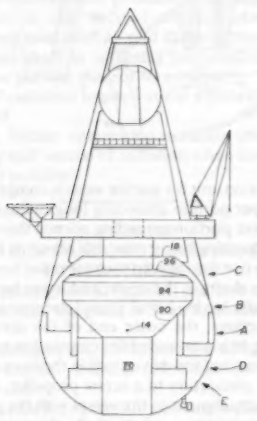
BUOYANT SPHERE

Kenneth E. Mayo, and Charles R. Fink, both of Nashua, N.H., assignors to Energy Systems Corporation, Nashua, N.H.

Filed Aug. 10, 1973, Ser. No. 387,335

Int. Cl.² B63B *39/00*

U.S. Cl. 114—267 **11 Claims**



1. A vessel comprising a hull containing structural means, ballasting members, compartments, appurtenances, power means and the like having a generally spherical outer surface adapted to be partially submerged in an upright position along a vertical diametric axis in a body of water undergoing continuous wave action, the mean water line of said wave action defining a water plane intercept in a horizontal cross section of the hull, said hull having a center of gravity below the geometric center and at least one elongated well within the interior of the hull forming an internal well extending symmetrically about said diametric vertical axis, an opening at the top of said well communicating with the atmosphere and an opening at the bottom of said well communicating with said water to permit free flow of water in said well, said well being sufficiently enlarged in the horizontal cross section substantially along the mean water line so that in combination with the surface of the hull the water plane intercept is reduced such that the period of the vertical oscillation of said vessel is greater than the period of vertical oscillation of any waves reasonably expected to be encountered at any level of submergence.

4. A buoyant body comprising a hull containing structural means, ballasting members, compartments, appurtenances, power means and the like having a generally spherical outer surface adapted to be partially submerged in an upright position along a vertical diametric axis in a body of water undergoing wave action, the mean water line of said wave action defining a water plane intercept in a horizontal cross section of the hull, the weight of said body and that of its contents being selected in accordance with the following relation to obtain a body having a natural period of vertical oscillation according to the following formula:

$$Th = 2\pi \sqrt{W/g\ K_s},$$

where

T_h equals the natural period of vertical oscillation (heave);

W equals the total displacement of the body;

g equals the gravitational constant; and

K_s equals the change in buoyancy per foot of change in water line,

said hull having a center of gravity below the geometric center and at least one elongated well within the interior of the hull extending along the vertical diametric axis of said hull, said well being open at both ends and communicating with the water and atmosphere, said well being sufficiently enlarged in the horizontal cross section substantially along the mean water line to significantly reduce the water plane intercept of the hull at any level of submergence so that the period of its vertical oscillation is increased to a desired value greater than the period of natural vertical oscillation.

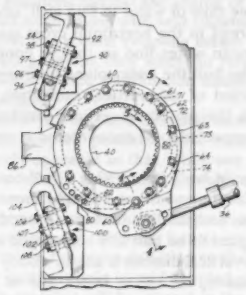
5. A buoyant body comprising a hull containing structural means, ballasting members, compartments, appurtenances, power means and the like adapted to be partially submerged in a body of water undergoing constant wave action, the mean water line of said wave action defining a water plane intercept in a horizontal cross section of the hull, the outer surface of said hull being formed in the general shape of a spherical surface, said ballasting members structural members, and appurtenances or the like being so distributed so that the center of gravity is below the geometric center as to provide a righting moment making the body float with a predetermined portion up in an upright position along a vertical diametric axis, said hull having an elongated well extending symmetrically along said vertical diametric axis open at both ends to atmosphere and the flow of water therein and of such dimension as to receive therein a column of water the height of which is responsive to the pressure of said body of water at the lower opening of such well, said well being sufficiently enlarged in the horizontal cross section at least above the mean water line integrating with that of the outer surface of said hull to reduce the intercept plane of said hull to make the period of its vertical oscillation greater than the period of vertical oscillation of any waves of significant height reasonably expected to be encountered by the body.

4,010,705

ROTATIONAL ENERGY ABSORBER APPARATUS FOR HYDROFOIL CRAFT STRUT

John Bradford Connell, 641 - 212th Ave. SE., Redmond, Wash. 98052, and John Weaver Williams, 16721 SE. 12th, Bellevue, Wash. 98008

Filed Oct. 6, 1975, Ser. No. 620,076
Int. Cl.² B63B *1/28*
U.S. Cl. 114—279 **11 Claims**



1. Rotational energy absorbing apparatus for the protection of a hydrofoil craft strut/foil means against impact energy damage causing strut axis rotation, comprising in combination:

a. a strut plate means rigidly mounted to said strut;

b. an outer plate disposed on said strut plate and rigidly mounted to said craft structure;

c. a plurality of yieldable means connected to said strut plate and to said outer plate and adapted for sequential shearing when said strut plate rotates about a substantially common perpendicular axis between said strut and said outer plate which axis is substantially parallel with said strut rotation axis and whereby each shearing action of each said plurality of yieldable means is adapted to take a part of said associated impact energy;

d. stop means mounted adjacent said strut plate;

e. said stop means including a rigidly mounted first portion and a second portion yieldably mounted by at least one yieldable restraining means to said first portion, and

f. a strut plate portion adapted to contact said second portion when said strut plate rotates and has sheared off said yieldable means and whereby said strut plate portion is adapted to dislocate said second portion in respect to said first portion, thereby shearing said yieldable restraining means.

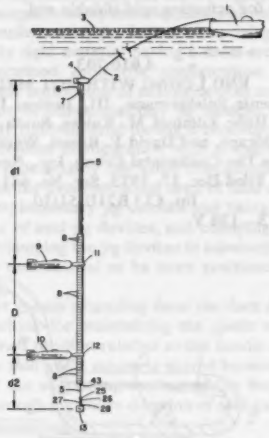
4,010,706

TOWED DEVICE FOR MEASURING MAGNETIC FIELD AND THE VERTICAL GRADIENT THEREOF AT SEA

Georges Jean-Marie Pretet, St. Renan, France, assignor to Etat Francais represente par le Delegue Ministeriel pour l'Armement, France

Filed Dec. 13, 1974, Ser. No. 532,679
Claims priority, application France, Dec. 13, 1973, 73.44465
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976
Int. Cl.² B63B *21/56*
U.S. Cl. 114—245 **6 Claims**

1. A towed device for measuring at sea variable magnitudes, comprising: a flexible carrying cable including a material having a low coefficient of elongation, a first and a second fish attached to said carrying cable, said first and second fish bearing measuring apparatus, said carrying cable being suspended from the end of a tow cable, a vertically downward pulling member connected to the bottom end of said carrying cable, said pulling member including a diving wing having a weighted fuselage provided on both sides with ailerons at a negative angle of incidence, said first and said second fish



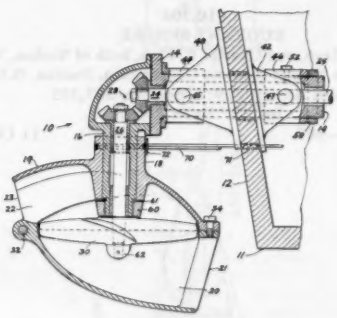
being fastened at a given distance apart in a central region of said carrying cable in such a manner that the measurements of the measuring apparatus are not affected on the one hand by the tow cable or on the other hand by the pulling member.

4,010,707

MARINE PROPULSION UNIT

Wilfrid H. Bendall, Castle Hill Road, Pawcatuck, Conn. 06379

Filed June 11, 1976, Ser. No. 695,146
Int. Cl.² B63H *11/02, 21/24*
U.S. Cl. 115—12 R **8 Claims**



1. A propulsion unit for marine vessels comprising a housing having an upper portion extending longitudinally through the hull and a lower portion extending normal thereto external to the hull, said housing being rotatable about its horizontal axis, said lower portion having a concentric outer housing rotatable thereon, drive shafts in the upper and lower housing portions, said drive shafts having bevel gears interconnecting the shaft inner end portions, the outer end of the drive shaft in the upper housing being extended for connection to a power plant and the outer end of the drive shaft in the lower housing being extended for connection to a screw propeller, said unit being arranged for attachment to the vessel with the propeller rotating in a horizontal plane substantially above and closely adjacent to the surface of a working fluid wake leaving the bottom surface of the vessel when under way, said outer housing comprising a fluid inlet duct on one side of the propeller plane

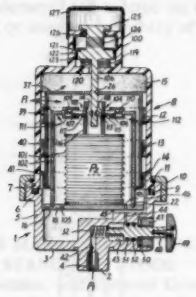
and an outlet duct on the opposite side, said inlet and outlet ducts, respectively, providing a rammed intake and directed discharge of the working fluid inducted when the vessel is under way, said outer housing being rotatable about its vertical axis for directional control of the vessel and said upper housing having adjustable mounting means for attachment of the unit to the vessel.

4,010,708

DIFFERENTIAL PRESSURE INDICATOR INCLUDING REMOTE SENSING MEANS

Francis C. Keledy, Butler, and Laszlo Nemes, West New York, both of N.J., assignors to Trodyne Corporation, Teterboro, N.J.

Filed Dec. 2, 1975, Ser. No. 637,031
Int. Cl.² G08B *1/00*
U.S. Cl. 116—65 **5 Claims**



1. A pressure responsive indicator comprising a pressure tight casing including means for connecting the interior of said casing in fluid pressure communication with a closed system to be monitored;

the improvement comprising

closed bellows means mounted within said casing under predetermined pressure;

a shaft reciprocally mounted in said casing for rectilinear motion between exposed and retracted positions;

means for biasing said shaft to the exposed position;

releasable means for maintaining said shaft in said retracted position;

means for coupling said shaft and bellows and responsive to a predetermined pressure differential between the pressure in said bellows and said closed system for releasing said shaft to said exposed position;

wherein said shaft in assuming said exposed position exposes one portion thereof to ambient;

a source of radiation located at the exposed portion of said shaft; and

said casing further comprising radiation shield means surrounding said source of radiation when said shaft is in the retracted position.

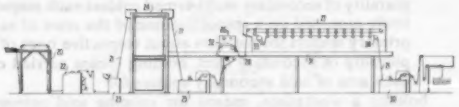
4,010,709

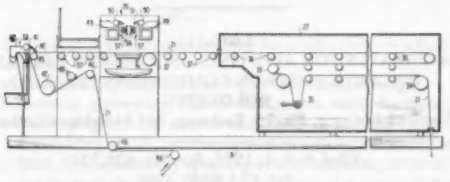
APPARATUS FOR RANDOMLY COLORING CARPET OR OTHER PILE FABRIC

Robert W. Sayman; John S. Quarles, and Howard J. Hamilton, all of Dalton, Ga., assignors to Shaw Industries, Inc., Dalton, Ga.

Filed Jan. 28, 1976, Ser. No. 653,211
Int. Cl.² B05C *11/00*; D06B *1/04*
U.S. Cl. 118—33 **11 Claims**

1. An apparatus for randomly coloring a pile carpet web or the like comprising means for supporting and conveying a carpet web on a substantially horizontal path of movement with the pile face of the carpet web upwardly, means substantially aligned horizontally with said supporting and conveying means and near the upstream end of the horizontal path of movement of the carpet web for applying a relatively thick viscous coating layer to the pile face of the carpet web during movement thereof, means downstream from the applicator means for said viscous coating for delivering liquid dye drippings randomly on top of said viscous coating layer from an overhead dye source whereby said dye drippings may pool and run in irregular rivulets on said viscous coating layer without





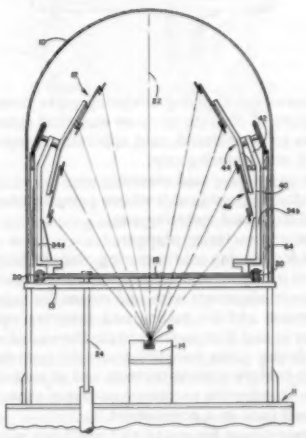
immediately penetrating into the carpet pile face, and elevated temperature means downstream from said dye delivery means and being substantially aligned horizontally with said supporting and conveying means and receiving the moving carpet web with the viscous coating layer and the dye drippings thereon and causing the viscous coating layer to disintegrate and settle into the carpet pile face with said dye drippings to thereby form a permanent random color pattern in the carpet pile face and to fix the dye.

4,010,710

APPARATUS FOR COATING SUBSTRATES

Ernest E. Williams, Fullerton, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sept. 20, 1974, Ser. No. 508,007
Int. Cl.² C23C *13/12*
U.S. Cl. 118—49 **20 Claims**



1. Apparatus for holding workpieces comprising

a base support,

an annular base mounted to said base support for rotation about a base axis,

means for driving said annular base about said axis, a plurality of cluster standards fixed to and upstanding from said annular base at points spaced about the periphery thereof, and

a plurality of cluster assemblies each respectively mounted on a respective one of said cluster standards, each said cluster assembly comprising

a primary multi-armed spider mounted on an associated cluster standard for rotation about a primary axis, a plurality of secondary multi-armed spiders each respectively mounted on a respective one of the arms of said primary spiders for rotation about respective ones of a plurality of secondary axes, holding means carried on each arm of said secondary spiders for

holding a workpiece, means for rotating said primary spiders relative to the associated cluster standard, and means for rotating each of said secondary spiders relative to the arm on which it is rotatably mounted.

4,010,711

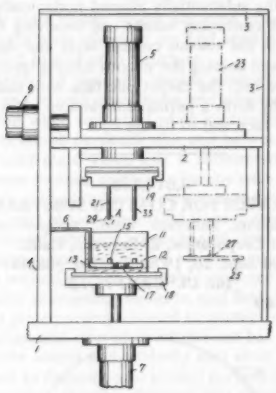
APPARATUS FOR APPLYING A SOLDERING PASTE TO DISCRETE SPOTS ON COMPONENTS PRIOR TO SOLDERING

Manfred Bodewig, No. 75, Eselsweg, 405 Monchen-Gladbach, Germany

Filed Nov. 4, 1975, Ser. No. 628,724

Int. Cl.² B05C *1/00*

U.S. Cl. 118—211 **12 Claims**



1. Apparatus for applying soldering paste from a bath of soldering paste to discrete spots on electrical communication components to be soldered, said apparatus comprising

a. at least one metering cup,

b. means supporting said metering cup,

c. means for supporting at least one component at a position spaced from said metering cup,

d. at least one metering plunger,

e. means for moving said metering plunger between a first position in alignment with said metering cup and a second position in alignment with said means for supporting said component and for raising and lowering said metering plunger at said first position to dip the end of said plunger in soldering paste contained in said metering cup and entrain soldering paste thereon and at said second position to transfer the entrained soldering paste to a predetermined spot on a component,

f. container means for containing soldering paste, and

g. means for raising and lowering said container means in synchronism with the ascent and descent of said metering plunger to immerse said metering cup in said soldering paste and fill said cup and to lower said container means to expose said metering cup above the level of said soldering paste in such a mannner that said metering cup is immersed in said soldering paste when said container means and said metering plunger are in their respective raised positions and the end of the metering plunger dips into the full metering cup above the level of the soldering paste when said plunger and said container means are in their respective lower positions.

4,010,712

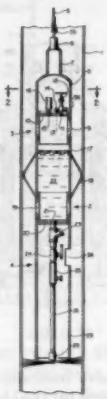
COATING APPLICATOR TOOL FOR WELL CASING

Michael G. Dugas, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Nov. 12, 1975, Ser. No. 631,034

Int. Cl.² B05C *7/02*

U.S. Cl. 118—306 **10 Claims**



1. An apparatus for the application of a relatively uniform interior protective coating to well casing in-place which comprises, in combination, a spray section and a container section, said container section including means for releasable attachment to said apparatus of a lowering line, a container head having an end wall defining the upper portion of the container, said container head end wall having filling and pressurizing means, vent means and pressure relief means and a container bottom having an end wall defining the lower portion of the container, said container bottom end wall having an outlet communicating with said spray section, said spray section having at least one spray nozzle connected through a conduit, said conduit containing a pressure regulated flow control valve means, to the container bottom end wall and communicating with the container section through said outlet in said container bottom end wall.

4,010,713

ELECTROSTATIC POWDER SPRAY COATING APPARATUS

Hermann Wirth, Gundelfingen, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Mar. 28, 1975, Ser. No. 563,075

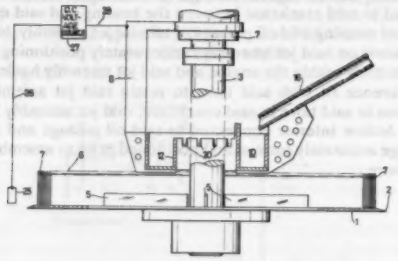
Claims priority, application Germany, Mar. 29, 1974, 2415296

Int. Cl.² B05C *5/02*

U.S. Cl. 118—621 **4 Claims**

1. Electrostatic powder spray coating apparatus having a rotary spray-distributing disk, means for feeding coating powder to the central portion of said disk, means for applying an electric field between articles to be coated and, on the other hand said disk and said feed means, whereby particles of said coating powder are launched mechancially field under the influence of which the powder is applied to articles said to be coated, and means for breaking up agglomerates of the coat-

ing material in its path towards the articles to be coated in the form of a regularly spaced cylindrical grid of a plurality of



elongated impact elements (6) located on the upper side of said rotary disk, at or near the periphery of the disk.

4,010,714

SYSTEM FOR MANAGING MILKING-COWS IN STANCHION STOOL

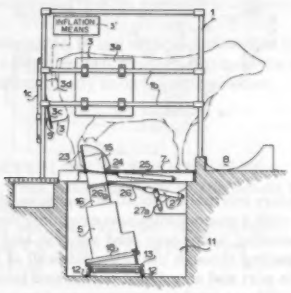
Iwao Notsuki, Narashino, and Katsumi Ueno, Chiba, both of Japan, assignors to Director, National Institute of Animal Industry, Aobacho, Japan

Filed Feb. 27, 1975, Ser. No. 553,894

Claims priority, application Japan, Mar. 8, 1974, 49-26844; Mar. 8, 1974, 49-26845

Int. Cl.² A01J *3/00*

U.S. Cl. 119—14.03 **8 Claims**



1. A system for managing milking-cows in stanchion stool comprising

a stool frame,

a stanchion member means for projecting the head of the cow therethrough.

a plurality of support member means secured to the stool frame for setting the body of the cow in a standing position,

stopper means for restricting the vertical movement of the neck of the cow, and

a milking unit set under the floor and capable of rising through a trap door disposed on the floor, said milking unit having a plurality of teatcups and means for raising the teatcups and means for stopping the raising of the teatcups so that the teatcups are fitted to the respective teats.

4,010,715

FLUID CONDUCTIVITY DETECTING MEANS

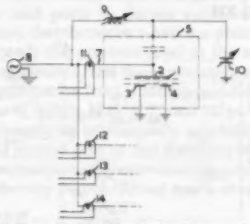
James D. J. Robar, and David G. Glass, both of Saskatoon, Canada, assignors to Seds Systems Ltd., Canada

Filed June 5, 1975, Ser. No. 584,069

Claims priority, application Canada, Oct. 18, 1974, 211755

Int. Cl.² A01J *7/00*

U.S. Cl. 119—14.14 **15 Claims**



1. Apparatus used in determining the conductivity of a fluid, comprising

a. an insulating tube for passing of fluid therethrough;

b. current generating means including a radio frequency alternating current source and a pair of laterally spaced conducting plates, each separated by a dielectric from the fluid, for capacitively coupling a radio frequency alternating current signal to the fluid to produce a conductivity current varying with the ionic conductivity of the fluid;

c. detection means connected to the conductive plates for detecting an alternating current passing through said fluid.

4,010,716

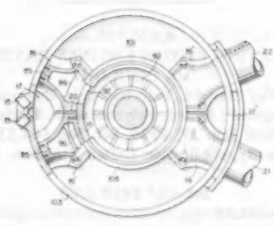
ROTARY ENGINE

Karlis Minka, 204 E. Joppa Road, Towson, Md. 21204

Filed July 12, 1974, Ser. No. 487,968

Int. Cl.² F02B *53/04*

U.S. Cl. 123—8.47 **16 Claims**

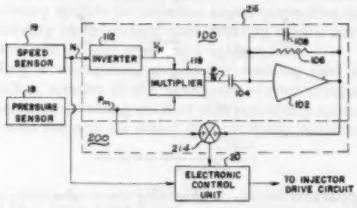


1. An internal combustion rotary engine comprising: a circular housing having axially spaced end walls, a peripheral casing interconnecting said end walls, and at least one intake port and at least one exhaust port, said ports being arranged on the peripheral casing; a pair of rotor halves disposed coaxially within said circular housing, each rotor half having N vanes, N being an even number and the vanes of one rotor half being interposed between the vanes of the other; oscillator means interconnected with said rotor halves for superimposing rotatory oscillations thereon whereby the rotor halves oscillate with respect to each other while rotating in the same direction; a pair of said vanes, the vanes being from alternate rotor halves, periodically defining together with said peripheral casing a hemispheroidal combustion chamber and a squish area, and another pair of said vanes, the vanes being from alternate rotor halves, periodically defining together with said peripheral casing a hemispheroidal scavening chamber, the scavenging chamber communicating with said intake port and said exhaust port.

4,010,717
FUEL CONTROL SYSTEM HAVING AN AUXILIARY CIRCUIT FOR CORRECTING THE SIGNALS GENERATED BY THE PRESSURE SENSOR DURING TRANSIENT OPERATING CONDITIONS

Lael Brent Taplin, Royal Oak, Mich., assignor to The Bendix Corporation, Southfield, Mich.

Filed Feb. 3, 1975, Ser. No. 546,239
Int. Cl.² F02B *3/00*
U.S. Cl. 123—32 EH **23 Claims**



1. An electronic fuel injection system for an internal combustion engine comprising:

engine sensor means for generating signals indicative of engine operating conditions, said sensor means including pressure sensor means for generating a pressure signal indicative of engine air intake manifold pressure, and speed sensor means for generating a speed signal indicative of engine operating speed;

pressure signal correction circuit means for generating a corrected pressure signal having a value equal to the sum of said pressure signal and a correction signal generated in response to said pressure signal and said speed signal, when the pressure signal is changing and indicative of a transient condition;

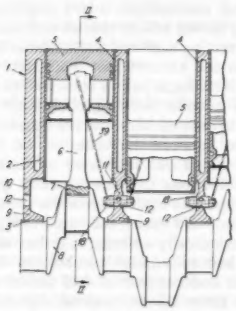
electronic control unit means for generating electrical signals indicative of engine fuel requirements in response to signals generated by said engine sensors, including said speed signal and said corrected pressure signal; and

fuel delivery means for delivering fuel in response to the signals generated by said electronic control unit means.

4,010,718
RECIPROCATING PISTON ENGINES HAVING PISTON OIL COOLING

William Findlay Stewart, Peterborough, England, assignor to Perkins Engines Limited, Peterborough, England

Filed Jan. 27, 1975, Ser. No. 544,530
Claims priority, application United Kingdom, Feb. 6, 1974, 5374/74
Int. Cl.² F01P *3/06*
U.S. Cl. 123—41.35 **6 Claims**

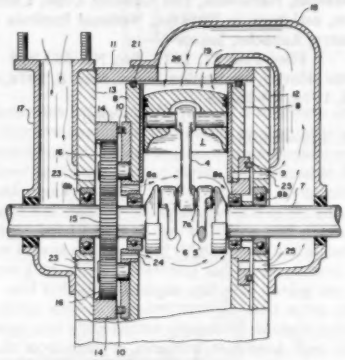


1. A reciprocating piston engine comprising a cylinder block having a cylinder therein, a piston reciprocable in the cylinder, a crankcase, a crank rotatable on a bearing in the crankcase, a connecting rod connecting the crank to the piston, a lubricating oil passage in said crankcase, a bore formed in said crankcase between the bearing and said cylinder and meeting said oil passage, a tubular jet assembly, locating means on said jet assembly for accurately positioning said jet assembly within the engine and said jet assembly having an interference fit with said bore to retain said jet assembly's position in said bore in said crankcase, said jet assembly having a hollow interior connected to said oil passage and a jet passage accurately formed and positioned prior to assembly in said bore.

4,010,719
ROTARY INTERNAL COMBUSTION ENGINE

Cleto L. Lappa, 541 Torwood Lane, Pittsburgh, Pa. 15236

Continuation of Ser. No. 357,195, May 4, 1973, abandoned.
This application Jan. 22, 1975, Ser. No. 543,135
Int. Cl.² F02B *57/04, 57/08*
U.S. Cl. 123—44 C **2 Claims**

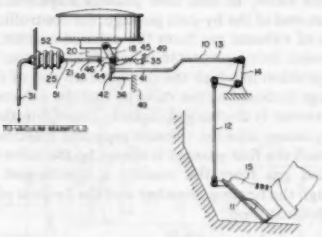


1. A rotary internal combustion engine including a housing, together with a gaseous inlet port extending through a sidewall of said housing, a one-way reed valve in said port, a second port extending through the other sidewall of said housing, a gas intake port and an exhaust port in said housing cylindrical portion, said gas intake port connected to a conduit to said second port, said rotary block having a pair of radially extending cylinders 180° apart, a pair of pistons, each slidably mounted on one of said cylinders, a crank shaft including a double throw provided by a pair of crank pins, a pair of connecting rods, each having one end connected to one of said pistons and the other end connected to one of said crank pins, a spark plug mounted on said housing to ignite the gaseous mixture introduced in said gas intake port at the moment when said pistons are outermost to effect power impulse movements of said block, whereby when both pistons move radially outwardly whereupon said reed valve is drawn open, the fuel mixture drawn in will fill both cylinders, and when said reed valve is forced closed by movement of said pistons radially inwardly, said drawn in fuel mixture will be fed through said conduit and said gas intake port to a single piston to effect supercharging.

4,010,720
ACCELERATOR PRESSURE CONTROL MECHANISM

Reginald H. Gram, West Hill, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Apr. 14, 1975, Ser. No. 564,096
Int. Cl.² F02D *11/08*
U.S. Cl. 123—103 R **3 Claims**



1. A throttle linkage for the carburetor of an internal combustion engine that encourages the operation of the engine at a high vacuum condition in the engine intake manifold, said linkage comprising

a carburetor, the throttle valve linkage of which is biased by first spring means to the idle position of the throttle valve,

an accelerator pedal linkage biased by second spring means to the idle position of the accelerator pedal, and

a bellows unit powered by the suction furnished from a tube joined to the intake manifold of said carburetor,

said pedal linkage and said bellows unit each fitted with means to engage the throttle valve linkage in parallel configuration,

said first spring means and said second spring means being of a magnitude to generate a total force together that is greater than the force generated by the bellows unit with

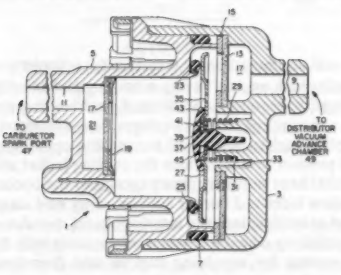
said bellows unit linked to the said throttle valve so as to apply a force to the throttle valve in the direction opposed to the force applied by each of said spring means and in the direction of the force applied to the throttle linkage by the pedal linkage when the accelerator pedal is moved away from the idle position, such that

an increase of suction in the bellows unit and in the intake manifold reduces the force required to hold the accelerator pedal linkage away from the idle position.

4,010,721
VACUUM DELAY/RELIEF VALVE

George Ludwig, Troy, Mich., assignor to The Bendix Corporation, South Bend, Ind.

Filed Apr. 24, 1975, Ser. No. 571,163
Int. Cl.² F02P *5/10*; F16K *21/02*
U.S. Cl. 123—117 A **5 Claims**

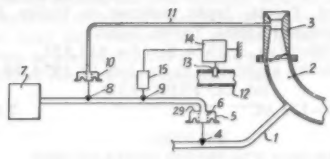


1. In an internal combustion engine having a vacuum source responsive to engine acceleration and a distributor vacuum advance chamber, a device for controlling communication between said vacuum source and said vacuum advance chamber to delay spark retard on moderate engine acceleration and to provide normal spark retard during substantially full throttle acceleration, said device comprising a housing having a first port communicated to said vacuum source and a second port communicated to said vacuum advance chamber, normally closed valve means responsive to the pressure differential between said ports to permit substantially uninhibited communication therebetween when the pressure level at said first port exceeds the pressure level at the second port by a predetermined amount, and flow restricting means permitting limited communication from said first port to said second port when said valve means is closed, said valve means including mechanism permitting substantially uninhibited communication from said second port to said first port when the pressure level at the second port is greater than the pressure level at the first port to thereby permit normal spark advance at all times.

4,010,722
METERING CONTROL FOR THE AIR-FUEL MIXTURE IN INTERNAL COMBUSTION ENGINES

Bernard R. Laprade; Xavier J. Laprade, both of 64260 Arudy, and Pierre J. Gele, Route de Lourdes, 65000 Tarbes, all of France

Filed Dec. 15, 1975, Ser. No. 640,934
Claims priority, application France, Dec. 20, 1974, 74.42191
Int. Cl.² F02M *23/04*
U.S. Cl. 123—119 D **16 Claims**



1. A metering-correction control apparatus for the air-fuel mixture in an internal combustion engine including an intake pipe, a device for metering the air-fuel mixture, and an exhaust manifold, said control apparatus comprising:

at least one auxiliary air supply branched at the engine intake pipe downstream of the metering device;

at least one valve for controlling the introduction of secondary air in said auxiliary air supply;

a spring-biased membrane capsule for controlling said valve;

a source coupled to said capsule for supplying a constant partial vacuum of predetermined magnitude; and

variable throttle means for modulating the partial vacuum applied to said capsule, said throttle means including first control means responsive to the rate of air-flow in the metering device of the air-fuel mixture to control the partial vacuum proportionally to said air-flow rate and second control means responsive to the composition of burnt gases in the exhaust manifold to control the partial vacuum as a function of the composition of the burnt gases.

4,010,723

EXHAUST GAS CLEANING APPARATUS FOR AN INTERNAL COMBUSTION ENGINE FOR A VEHICLE

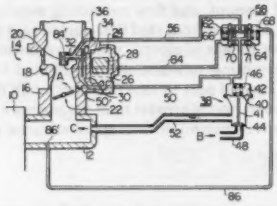
Katsumi Suziki; Katsunori Kawatake; Hiroshi Sawada, and Hiroki Matsuoka, all of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Dec. 30, 1975, Ser. No. 645,392

Claims priority, application Japan, Oct. 15, 1975, 50-124132

Int. Cl.² F02M *25/06*

U.S. Cl. 123—119 A **4 Claims**



1. An exhaust gas cleaning apparatus for an internal combustion engine for a vehicle having a carburetor including an air bleed system to bleed air to a fuel line of said carburetor, and having an exhaust gas recirculation valve including a diaphragm mechanism which is controlled by negative pressure in said carburetor so as to recirculate a part of said exhaust gas from the exhaust manifold in the intake manifold, said apparatus comprising: a second air bleed system to bleed air to the fuel line of said carburetor; and valve means for communicating said second air bleed system and said diaphragm mechanism of the exhaust gas recirculation valve with the atmosphere, in response to negative pressure in the venturi of said carburetor and intake manifold, thereby both the recirculating operation of a part of the exhaust gas and the supplying operation of a rich air-fuel mixture to the engine can be attained during the accelerating operation of the vehicle.

4,010,724

APPARATUS FOR HEATING AN INTAKE MANIFOLD IN AN INTERNAL COMBUSTION ENGINE

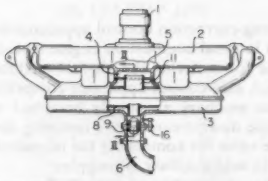
Hiroshi Sami, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Oct. 3, 1974, Ser. No. 511,522

Claims priority, application Japan, July 17, 1974, 49-81840

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 AC **7 Claims**



1. In an internal combustion engine comprising an intake manifold having a riser portion, an exhaust gas reactor, and an exhaust pipe, the improvement comprising:

a heating chamber for heating the intake manifold, said chamber being arranged directly and immediately below the riser portion of the intake manifold,

a first passage connecting the interior of the reactor to the exhaust pipe,

a straight vertical conduit fluidly communicating the interior of the reactor and said heating chamber, said one end of said conduit opening directly into said heating chamber in a direction toward said riser portion so that exhaust gas passing through said conduit can directly strike the riser portion the other end of said conduit opening directly into the reactor,

a by-pass passage, for exhaust gas, in the reactor, the upstream end of said by-pass passage opening into said heating chamber and the downstream end of said by-pass passage opening into the first passage,

a control valve, in said first passage adjacent the downstream end of the by-pass passage, for controlling the flow route of exhaust gas from the exhaust reactor, said control valve being pivotable in said first passage between a first position in which the downstream end of the by-pass passage is closed by the valve so that the exhaust gas from the reactor is discharged directly therefrom through said first passage into the exhaust pipe and a second position in which the first passage is closed by the valve so that the exhaust gas from the reactor is discharged therefrom through the heating chamber and the by-pass passage into the exhaust pipe.

4,010,725

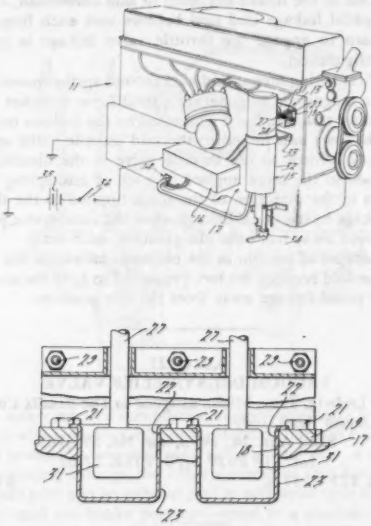
SELF-CONTAINED ENGINE WARMER

Cygnal G. White, 4835 Read Blvd., New Orleans, La. 70127

Filed Nov. 14, 1974, Ser. No. 523,679

Int. Cl.² F02N *17/02*

U.S. Cl. 123—142.5 R **2 Claims**

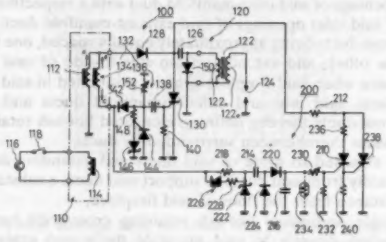


1. A self-contained heating system for a liquid cooled internal combustion engine having a cooling jacket with an opening formed in an outer wall thereof, said heating system comprising a mounting portion having a flange adapted to engage the cooling jacket outer wall around the opening and a cup-shaped portion extending into the cooling jacket and having a substantial heat radiating area exposed to the coolant therein, a flameless infra-red burner supported by said mounting portion and extending into the interior of said cup-shaped portion for establishing a heat exchange relationship with the coolant, a fuel source for supplying fuel to said flameless infra-red burner, and an electrical ignition system for said burner fired by the battery of the associated engine independent of the vehicle ignition system.

4,010,726
DEVICE FOR PREVENTING AN OVERRUNNING OPERATION OF AN INTERNAL COMBUSTION ENGINE

Tetsuya Kondo, Susono, and Katumasa Miyazaki, Numazu, both of Japan, assignors to Kokusan Denki Co., Ltd., Numazu, Japan

Filed July 23, 1975, Ser. No. 598,214
Int. Cl.² F02P 1/00
U.S. Cl. 123—148 CC **7 Claims**



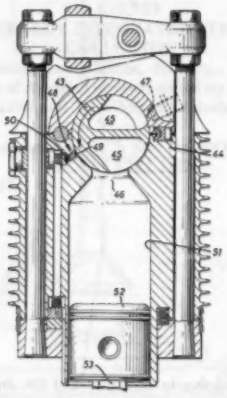
1. A device for preventing an overrunning operation of an internal combustion engine, provided in a capacitor discharge type breakerless ignition system comprising a magneto generator including an ignition power coil and at least one loading coil and an ignition circuit including a capacitor charged from said ignition power coil of said magneto generator, an ignition coil and a discharging thyristor, energy from said capacitor being discharged through the primary side of said ignition coil when said discharging thyristor is triggered in time with said engine, said device comprising an ignition failing thyristor shunting said discharging thyristor whereby a discharge current from said capacitor is prevented from being supplied to said ignition coil; means to trigger said ignition failing thyristor when said engine revolves at more than a predetermined revolution number per minute, including a revolution number detecting generator providing a voltage indicative of the revolution number per minute of said engine, a first capacitor charged by said revolution number detecting generator, and a second capacitor having a greater electrostatic capacity than said first capacitor and also charged by said revolution number detecting generator, a Zener diode connected across said first and second capacitors, said ignition failing thyristor being connected to said second capacitor whereby said ignition failing thyristor is triggered when the voltage across said second capacitor reaches a predetermined value corresponding to the maximum allowable revolution number per minute of said engine, and an auxiliary thyristor connected in parallel to said ignition failing thyristor and an impedance connected in series with said ignition failing thyristor to limit current flow therethrough, said auxiliary thyristor having the gate thereof connected to the cathode of said ignition failing thyristor whereby a potential at the cathode of said ignition failing thyristor causes said auxiliary thyristor to be triggered.

4,010,727
INTERNAL COMBUSTION ENGINE

Michael Ellison Cross, 52 Bloomfield Avenue, and Albert Edward Coles, 366 Bloomfield Road, both of Bath, England

Filed Sept. 6, 1974, Ser. No. 504,689
Claims priority, application United Kingdom, Sept. 7, 1973, 42104/73
Int. Cl.² F01L 7/00
U.S. Cl. 123—190 DL **3 Claims**

1. A method of enhancing the performance of an internal combustion engine which includes a rotary valve for controlling the inlet of combustible mixture to and the exhaust of combustion products from the combustion chamber of an engine, which rotary valve comprises a valve housing, an opening in the valve housing communicating with the combustion chamber, a valve member rotatably mounted within the housing, a port within the valve member which comes into and out of registration with the said opening as the valve member rotates, said method comprising the steps of rotating the valve member in a timed relationship to the engine, supplying a copious amount of lubricant to the interface between the valve member and the valve housing at a location after rotation of the valve member past the opening to lubricate and cool the valve, removing excess lubricant from the valve member before said member passes over the opening to an extent that leaves on the valve member a film of lubricant of from 40 to 50μ inches by rotating the valve member past a rigid scraper blade held in the valve housing, said scraper blade



being of axial extent greater than that of the valve port and resiliently biased towards the surface of the rotatable valve member, such that the magnitude of the resilient bias coupled with the rigidity of the scraper blade produces a deformity of the scraper blade of not more than 1/3000 of the diameter of the valve when the valve port and the scraper blade are in register whereby the said film of lubricant of from 40 to 50μ inches results, which film serves to seal the valve member to the housing around the said opening, scraped off lubricant being removed through a passage in the housing and through one or more non-return valves located in the said passage providing an area of reduced pressure to assist in the drainage of lubricant removed by the scraper blade.

4,010,728
CIRCULATING FIREPLACE SYSTEM

Rod A. Hempel, Huntington; Walter P. Tittman, Fort Wayne, and Santosh D. Sheth, Huntington, all of Ind., assignors to American Standard, Inc., New York, N.Y.

Filed June 2, 1975, Ser. No. 582,589
Int. Cl.² F24B 1/18
U.S. Cl. 126—120 **19 Claims**

1. A Thermal system comprising:

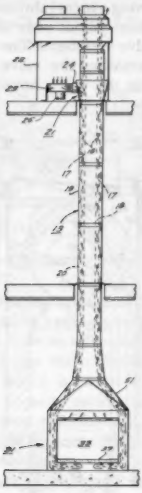
a. a thermosiphonic chimney having a flue, an intermediate chimney pipe and an outer chimney pipe concentric therewith and spaced successively outward therefrom whereby to define between said flue and said intermediate chimney pipe an intermediate chimney duct and whereby to define between said intermediate chimney pipe and said outer chimney pipe an outer chimney duct;

b. a heat source having an inner chamber and spaced successively outward therefrom an intermediate casing and an outer casing, said inner chamber being coupled to the flue of said thermosiphonic chimney, said intermediate casing being coupled to the intermediate chimney pipe of said thermosiphonic chimney, said outer casing being coupled to the outer chimney pipe of said thermosiphonic chimney, and the zone between said inner chamber and

said intermediate casing being in communication with the zone between said intermediate casing and said outer casing;

c. air-intake assembly having a tapered structure mounted around the outer chimney pipe of said thermosiphonic chimney and

d. means for impelling gas through said tapered structure into said outer chimney duct from a source external to



said thermosiphonic chimney and for directing said gas through said outer chimney duct to the zone between said intermediate casing and said outer casing of said heat source; and

e. outlet means associated with said heat source for delivering to a zone external to said heat source at least a portion of the gas impelled into said outer chimney duct and directed therethrough to said heat source.

4,010,729

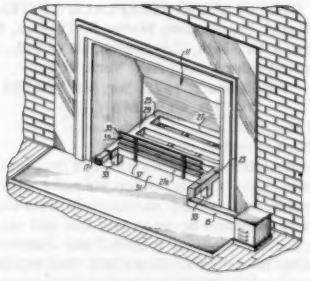
FIREPLACE FURNACE

Glen H. Egli, Stuart Draft, Va., assignor to Joglex Corporation, Palmyra, Va.

Filed Apr. 2, 1975, Ser. No. 564,273

Int. Cl.² F24B 7/00

U.S. Cl. 126—121 **20 Claims**



1. A forced-air heating fireplace grate for supporting burning materials in a fireplace, said grate comprising:

a single, inlet-manifold duct to extend from front to rear of said fireplace for receiving cool air introduced into said fireplace grate, said single, inlet-manifold duct having an inlet opening for receiving said cool air, and at least three exit openings positioned along the length thereof for releasing air laterally thereof;

a single, exhaust-manifold duct to extend from front to rear of said fireplace for receiving all warm air in said fireplace grate prior to its expulsion from said fireplace grate, said single, exhaust-manifold duct having an exhaust opening positioned at the end thereof so as to be at the front of said fireplace when said grate is positioned in said fireplace and a number of inlet openings corresponding to said exit openings of said inlet-manifold duct positioned along the length thereof for receiving said warm air laterally thereof;

a separate cross duct interconnecting each of said exit openings of said inlet-manifold duct with a respective one of said inlet openings of said exhaust-manifold duct, said cross ducts being approximately equally spaced, one from the other, and extending from side-to-side of said fireplace when said fireplace grate is positioned in said fireplace, said inlet-and exhaust-manifold ducts and said cross ducts thereby defining elongated hot-ash retaining spaces therebetween surrounded by ducts;

legs attached to some of said ducts and extending downwardly from said ducts to support said ducts a substantial distance from the floor of said fireplace;

a single, individual hot-ash retaining cross-grille bar attached directly to said manifold ducts and extending longitudinally of, and across the bottom of each of said hot-ash retaining spaces so as to retain large amounts of hot ashes falling from said burning materials in said hot ash retaining spaces prior to its falling to the floor of said fireplace while allowing efficient fire-supporting ventilation.

4,010,730

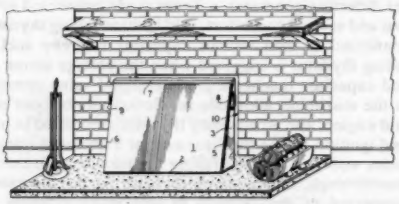
FIREPLACE SHIELD

Terry L. Mitchell, Rte. 3, Loganville, Ga. 30249

Filed June 11, 1975, Ser. No. 585,790

Int. Cl.² F24C 15/10

U.S. Cl. 126—140 **2 Claims**

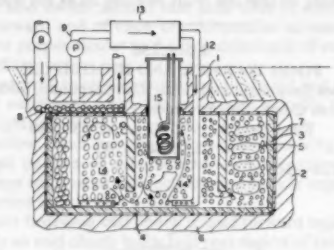


1. A shield for use in combination with a fireplace having a front opening, said shield comprising a front panel, a pair of side panels disposed respectively at the ends of said front panel and extending generally transverse to said front panel, the side edges of said front panel interconnected respectively with the edges of said pair of side panels remote from said opening by means of a gastight reinforcing seam, each of said reinforcing seams having a strip integral with a side edge of said front panel and another face contacting strip integral with the adjacent edge of the corresponding side panel, a base interconnected with the lower edges of said front panel and said pair of side panels, a top piece interconnected with the upper edges of said front panel and said pair of side panels, and the lower portion of said front panel being spaced from said opening a greater distance than the upper portion of said front panel when said shield is disposed adjacent said opening, said shield being effective to eliminate discharge of heated room air through said opening.

4,010,731
HEAT STORAGE TANK

Henry Harrison, Locust Valley, N.Y., assignor to Halm Instrument Co., Inc., Glen Head, N.Y.

Filed Oct. 23, 1975, Ser. No. 625,061
Int. Cl.² F24J 3/02; F24H 7/00
U.S. Cl. 126—271 8 Claims

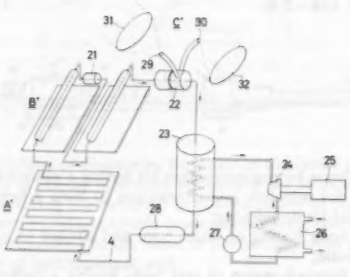


1. A heat storage tank mounted in a pit in the ground, said pit having a continuous side portion and a bottom,
- a lining of incompressible insulating material mounted against said continuous side portion of said pit,
- a liquid-impervious flexible liner tank having a continuous side portion and a bottom mounted against said incompressible insulating material and a top portion resting on the contents of said tank,
- at least one insulating barrier extending down from said top to a point adjacent the bottom of said tank, said barrier dividing said tank into at least a first and a second portion,
- heat storage material substantially filling said tank, said heat storage material having sufficient voids to permit circulation of heat transfer liquid,
- a hot liquid intake pipe extending adjacent to the bottom of said tank in said first portion thereof,
- a cool liquid out-take pipe extending adjacent to the bottom of said tank in said second portion thereof,
- and means for withdrawing heat from the upper part of said first portion of said tank.

4,010,732
MULTI-STAGE SYSTEM FOR ACCUMULATION OF HEAT FROM SOLAR RADIANT ENERGY

Shinji Sawata, Higashi-Murayama; Tatsuo Tani, Koganei, and Takashi Horigome, Tanashi, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Mar. 26, 1975, Ser. No. 562,196
Claims priority, application Japan, June 15, 1974, 49-67646; June 21, 1974, 49-70298
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 3 Claims

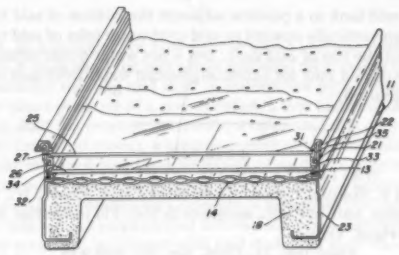


1. In a system for the accumulation of the solar radiant energy adapted to have the solar radiant energy absorbed by heat-absorption means and transferred therefrom to a heat-transfer medium for thereby heating said heat-transfer medium, a multi-stage system for the accumulation of the solar radiant energy which comprises:
- a plurality of heat-absorption apparatuses arranged in a series connection and having different selectively penetrating membranes disposed respectively on said heat-absorption apparatuses and possessed of properties suitable for reflecting electromagnetic wave energies of different magnitudes corresponding to ascending degrees of temperature respectively rated for the heat-transfer medium at said plurality of stages.

4,010,733
STRUCTURALLY INTEGRATED STEEL SOLAR COLLECTOR

Stanley W. Moore, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed June 3, 1975, Ser. No. 583,374
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 7 Claims



1. A solar energy collector unit comprising:
- an expanded metal energy collector panel including an upper sheet and a lower sheet;
- a substantially I-shaped upstanding portion at either side of said collector panel unitary with said upper sheet;
- a substantially C-shaped downwardly extending portion at either side of said collector panel unitary with said lower sheet;
- glazing support means adjacent each of said upstanding portion;
- a transparent panel covering said upper sheet secured by said glazing support means and,
- insulation covering the bottom of said lower sheet between said downwardly extending portions.

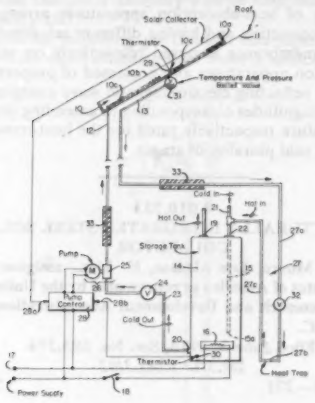
4,010,734
CLOSED SYSTEM SOLAR HEATER

Emil L. Chayet, Largo, Fla., assignor to Solar Energy Dynamics Corporation, Tampa, Fla.

Filed Mar. 10, 1976, Ser. No. 665,648
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 10 Claims

1. A solar heating system comprising a solar collector constructed to receive solar radiation and having a water inlet for admitting water to said collector to be heated by said solar radiation, said solar collector including a hot water outlet for the egress of heated water from said collector, a water storage tank, supply means for supplying compratively cold water to said tank at a cold water inlet adjacent the top of said tank, a cold water outlet from said tank located adjacent the bottom of said tank, a first water line connecting said cold water outlet of said tank to said water inlet of said solar collector, a second water line connecting said hot water outlet of said solar collec-

tor to said cold water inlet of said tank, said second water line including a heat trap comprising a substantially U-shaped water line section external of said tank extending from said solar collector hot water outlet vertically downward past the



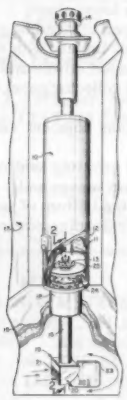
top of said tank to a position adjacent the bottom of said tank and then vertically upward to said cold water inlet of said tank adjacent the top of said tank, and a hot water outlet adjacent the top of said tank for extracting heated water from said tank for utilization.

4,010,735

WATER HEATER AIR INLET CONTROL

Robert F. Stanley, Glendale, and Henry Jack Moore, Jr., Los Angeles, both of Calif., assignors to Mor-Flo Industries, Inc., Cleveland, Ohio

Filed Jan. 21, 1976, Ser. No. 650,935
Int. Cl.² F24H *1/18*
U.S. Cl. 126—350 R **5 Claims**



1. An air inlet control means for a hot water heater having an air inlet opening in its lower end, including:

a. an air tube communicating at its upper end with said air inlet opening and extending vertically downwardly and,

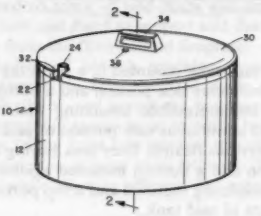
b. an air-cup assembly mounted to the lower end of said air tube for rotation about a vertical axis and including a front opening facing horizontally and a rearwardly extending rudder and having an air scoop portion defined by an upwardly curved rear wall opposite said front wall for guiding incoming air into the lower end of said air tube, said upwardly curved rear wall including an upper rear opening displaced in a vertical direction from said front opening and facing rearwardly for permitting an excess of air scooped in through said front opening to bypass said air tube so that a controlled air flow passes up said air tube, whereby said air tube can extend downwardly through the floor of a trailer home or camper to expose the air cup assembly to wind blowing under the trailer home or camper, said rudder orienting the air cup assembly so that the front opening faces the wind.

4,010,736

FOOD WARMER AND HUMIDIFIER

Norma Rose Sacomani, and Louis Paul Sacomani, both of 1426 San Lucas Court, Solana Beach, Calif. 92075

Filed Dec. 8, 1975, Ser. No. 638,700
Int. Cl.² F24D *1/00*
U.S. Cl. 126—369 **9 Claims**



1. A food warmer and humidifier comprising:

a double walled container with an outer wall and an inner wall enclosing a water jacket, and having an inner food holding chamber;

said container having an upper peripheral rim at which said outer and inner walls are connected;

said container having a closed bottom portion and said chamber having a closed bottom panel spaced from said closed bottom portion;

said water jacket having a primary vent extending through said rim;

at least one steam port in said inner wall communicating from said water jacket into said chamber, said port being circumferentially spaced from said primary vent at a distance related to a predetermined steam flow through the port;

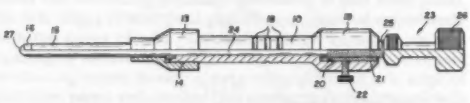
and a lid adapted to seat on said rim.

4,010,737

BONE BIOPSY INSTRUMENT KIT

Miklos I. Vilaghy, and Gabor Zellerman, both of Apt. 1508, 830 Ontario St., Toronto 282, Canada

Continuation of Ser. No. 152,896, June 14, 1971, abandoned. This application July 18, 1973, Ser. No. 380,131
Int. Cl.² A61B *10/00*
U.S. Cl. 128—2 B **12 Claims**



1. A bone biopsy instrument kit having a plurality of parts shaped for selective interconnection to form a bone biopsy tool, said kit comprising:

a. a body having an axial bore and shaped to serve as a handle;

b. a forward region of said body having a socket radially larger than said axial bore and formed around said axial bore;

c. a selected one of a plurality of interchangeable needles being seated in said socket, and each of said needles being generally cylindrical, hollow and strong enough to be driven axially into a bone, the hollow interior of said selected one of said needles being aligned with said axial bore of said body;
d. each of said needles having a rear region with a substantially identical radial enlargement shaped to fit removably into said socket around said axial bore of said body;
e. a forward end of each of said needles terminating in a plane perpendicular to the cylindrical axis of each of said needles;
f. an external bevel sharpening said forward end of each of said needles to a circular knife edge suitable for driving straight into bone;
g. a hollow chuck having a bore snugly receiving the cylindrical portion of said selected one of said needles to engage said radial enlargement in said rear region of said selected one of said needles;
h. means fastening said chuck to said forward region of said body so said chuck holds said rear region of said selected one of said needles firmly in said socket;
i. a stylet having a shaft extending through said body and shaped for moving axially in a snug, sliding fit through said bore of said body and through said selected one of said needles held in said socket by said chuck; and
j. screw thread means connecting said stylet to said body for moving and positioning a forward end of said stylet axially relative to said forward end of said selected one of said needles as a function of the threading together of the parts of said screw thread connecting means, said body, said selected one of said needles, said chuck, said stylet, and said screw thread connecting means forming said bone biopsy tool when assembled as defined.

4,010,738

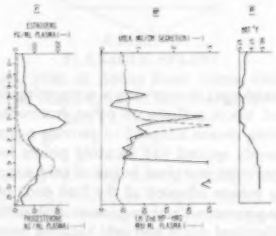
METHOD OF PREDICTING AND DETECTING OVULATION

George Preti, Philadelphia, and George Richardson Huggins, Wallingford, both of Pa., assignors to The Trustees of the University of Pennsylvania, Philadelphia, Pa.

Continuation-in-part of Ser. No. 519,220, Oct. 30, 1974. This application Apr. 2, 1975, Ser. No. 564,348

Int. Cl.² A61B *10/00*

U.S. Cl. 128—2 R **20 Claims**



1. A method of diagnosing the onset of the fertile period or ovulation in female mammals comprising the steps of:
a. monitoring the variation in concentration of the vaginal secretions of one of said mammals for urea, said variation corresponding to the onset of the fertile period or ovulation of said mammal; and
b. providing an indicator means for qualitatively and quantitatively responding to the concentration of said urea in said vaginal secretions; whereby the response of said means is diagnostic of the onset of the fertile period or ovulation in said female mammal.

4,010,739

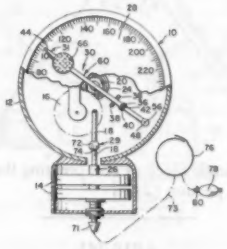
SPHYGMOMANOMETER

John Meredith Leach, Box 341, Port Jefferson, N.Y. 11777

Filed Nov. 3, 1975, Ser. No. 628,227

Int. Cl.² A61B *5/02*

U.S. Cl. 128—2.05 G **2 Claims**



1. In a gauge of the type used in blood pressure determinators, a main shaft for said gauge mounted for rotation therein, means for rotating said shaft in accordance with variations in the blood pressure of a given subject, a first hand mounted on said shaft for rotation therewith, a calibrated dial over which said first hand moves, a pivot mounted on said first hand at a point removed from said mounting of said first hand on said main shaft for movement with said first hand, a second hand mounted for rotation on said pivot, a second pivotal mounting for said second hand carried thereby at a point removed from said pivot and in contact with said dial, stop arms carried by said first hand in position to permit limited movement of said second hand separate from movement of said first hand at which time said second hand pivots on said pivot carried by said second hand which is at that time in stationary contact with said dial, said stop arms being in position to contact said second hand at the end of its limited movement and move said second hand with said first hand at which time said pivot carried by said second hand slides over said dial in contact therewith.

4,010,740

SPECULUM

Ove Gustav Littorin, Stockholm, Sweden, assignor to ABM-Mavello AB, Stockholm, Sweden

Filed Apr. 21, 1976, Ser. No. 678,759

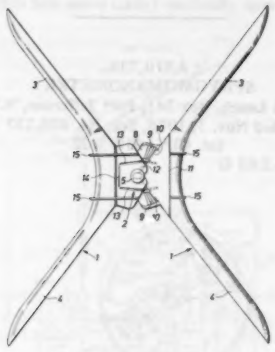
Claims priority, application Sweden, Apr. 21, 1975, 7504607

Int. Cl.² A61B *1/32*; A61M *29/00*

U.S. Cl. 128—17 **8 Claims**

1. A speculum arranged for examining body cavities and consisting of two angle pieces (1) each having a generally U-shaped cross-section along substantially the whole of its length, and consequently having trough-like legs (3, 4) of which one leg (3) is preferably narrower than the other (4), both angle pieces (1) with their troughs facing each other being removably connectable to each other with side portions of the angle pieces on either side of the speculum overlapping each other to form a pivot portion (2), from which the four legs (3, 4) extend, being movable together or apart by means of one pair of legs (3, 4), one from each angle piece (1), serving as handles for operating the other pair (4, 3), characterized in that both angle pieces (1) are made identically alike and that in the area of the pivot portion (2) each has on one

side a pin (5) and on the opposite side a hole (6), the hole in each angle piece (1) being made to accommodate the pin (5)

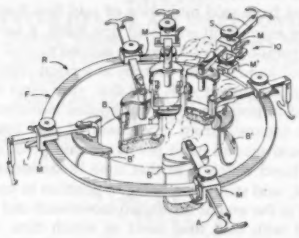


of the opposing angle piece (1) for creating the pivoting function of the pivot portion (2).

4,010,741
SURGICAL RETRACTOR

William Kohlmann Gauthier, 310 Codifer Blvd., Metairie, La. 70005

Filed Jan. 22, 1976, Ser. No. 651,267
Int. Cl.² A61B *17/02*
U.S. Cl. 128—20 **7 Claims**

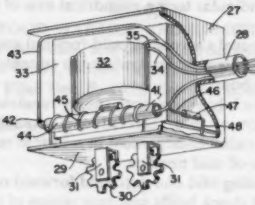


1. A surgical retractor for use in surgery to hold an incision open and to retain intestines out of the way to provide working area for performing a surgical procedure, comprising: a frame means; a plurality of retractor arm means releasably carried by the frame means for movement along the frame means and for movement transversely of the frame means, and including retractor blade means carried by the arm means in a position to be disposed in an incision to engage the flesh at the edge of the incision to hold the incision open; extension bottom mounting member releasably carried by the frame means for movement along the frame means; upstanding extension means carried by the extension mounting member for movement therewith and extending above the plane of the frame means and including an upper mounting member connecting said arm means to said extension means, said mounting member being substantially similar to said extension mounting member, whereby said mounting member can connect said arm means to either said frame means or said upstanding extension means; further retractor arm means carried by the extension means in an elevated position above the plane of the frame means, thus providing a space between the further retractor arm means and the frame means, in which intestines removed from the abdominal cavity through the incision may be placed; and blade means carried by the further retractor arm means in a position to engage the intestines and retain them out of the abdominal cavity to provide working area for a surgical procedure.

4,010,742
ELECTRON THERAPY DEVICE

In Su Kim, 54-1, 2-ka, Myeong-dong, Junk, Seoul, South Korea

Filed July 15, 1975, Ser. No. 596,164
Claims priority, application South Korea, July 29, 1974, 743200
Int. Cl.² A61H *29/00*
U.S. Cl. 128—24.4 **6 Claims**

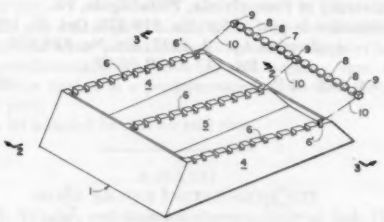


1. An electron therapy device for the treatment of ailments of the human body comprising a vibrator including a casing having a vibratory panel of conductive material, electrically energized means housed in said casing for imparting vibration to said panel, applicator means of conductive material mounted on said panel for contact with the human body, and means for supplying negative electrons only to said panel and applicator means whereby, when said applicator means are brought into contact with the human body, negative electrons are introduced into the body.

4,010,743
FOOT MASSAGER

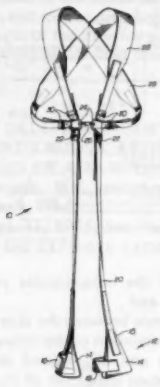
Ron Fitzsimons, 5557 Fleming St., Vancouver, British Columbia, Canada

Filed Mar. 30, 1976, Ser. No. 672,043
Int. Cl.² A61H *15/00*
U.S. Cl. 128—57 **6 Claims**



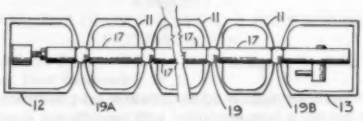
1. A foot massager comprising a supporting frame adapted to be located upon a floor or other horizontal supporting surface, spacing means adapted to provide a first and second row of uniformly spaced rod locating points located on two opposed uppermost marginal edges of said supporting frame, rods locating means adapted at the free ends of each of said rods providing removable engagement with said two opposed uppermost marginal edges and said locating points, a plurality of uniform diameter spherical balls each in touching engagement along each of said rods intermediate said rods locating means adapted to rotate about cylindrical holes whose longitudinal axes pass through the origins of said balls, said rods passing through said cylindrical holes, a plurality of individual rods fitted with said balls thereupon having parallel longitudinal axes the free ends thereof aligned along said two marginal edges, one of said rods fitted with said balls selectively adapted to be located parallel to another of said rods having a distance between disimilar to the distance between another pair of adjacent parallel rods.

4,010,744
FOOT-NECK HARNESS DEVICE
Steven G. Boyen, 3875 Wilshire Blvd., Los Angeles, Calif. 90005
Filed Mar. 11, 1976, Ser. No. 665,880
Int. Cl.[2] A61H *1/02*
U.S. Cl. 128—75 2 Claims



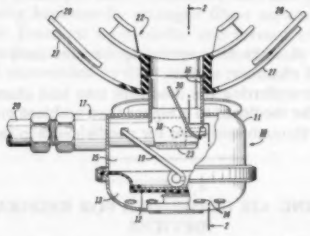
1. A harness device for maintaining flexion of a person's hips and knees while reclining in a horizontal lateral position, comprising:
sling means for securing a person's feet and including heel strap means,
shoulder-chest strap members having adjustable lengths and attached to ring members, said ring members being connected to each other in close proximity and located in a position corresponding to the approximate center of said person's chest,
strap members with adjustable lengths, said strap members connecting said sling means to said ring members,
and formed to extend in close proximity to each other and longitudinally between said person's legs from said sling means to said ring members while said person is reclining in a horizontal lateral position, whereby
traction is produced and maintained on said person's low neck-upper back area when said harness device is pulled taut on said person.

4,010,745
FLEXIBLE SPLINT
Jack L. Height, 3900 St. Johns Road, Lima, Ohio 45806
Filed Mar. 4, 1976, Ser. No. 663,964
Int. Cl.[2] A61F *5/04*
U.S. Cl. 128—87 R 12 Claims



1. A flexible splint comprising:
a plurality of similar pads, positioned in a line in a single series;
connecting means comprising a cable connecting all said pads with each other;
friction means comprising tubes and balls separating each said pad from its adjacent pads; and
adjusting means for adjusting the tension of said cable, whereby said adjusting means controls the degree of friction of said friction means.

4,010,746
REGULATOR WITH WATER FILL MECHANISM TO PREVENT FREE FLOW
Vernon G. Pedersen, Chicago, Ill., assignor to Dacor Corporation, Northfield, Ill.
Filed Aug. 25, 1971, Ser. No. 174,618
Int. Cl.[2] A62B *7/04*
U.S. Cl. 128—147 5 Claims



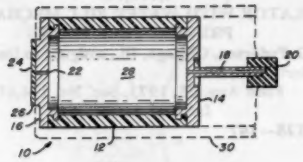
1. A pressure regulator for use in underwater breathing apparatus, said regulator including a housing; a diaphragm dividing the housing into a first compartment open to the ambient and a second compartment from which extends a mouthpiece tube through which the user breathes; an air inlet orifice opening into said second compartment; a valve for controlling the flow of air to said orifice; and means connecting said valve to said diaphragm for opening the valve when a pressure differential of at least a predetermined amount is provided between said first and second compartments, the invention being characterized by
means for channeling water into said second compartment through a portion of said mouthpiece tube when said valve is open and said regulator is immersed in water with said tube open to the water to cause said valve to close,
said means for channeling comprising
a partition disposed in said mouthpiece tube and extending a substantial distance from within said second compartment into said tube and dividing said tube into two adjacent passageways respectively opening into said second compartment, and
the inner end of said partition being offturned away from said orifice over one of said passageways to reduce the air flow from said orifice through said one of said passageways to permit water to flow therethrough into said second compartment while said valve is open.

4,010,747
METHOD OF STORING AN AMPOULE FOR A NEEDLELESS HYPODERMIC INJECTOR
Wesley D. Clark, 26870 Taaffe Road, Los Altos Hills, Calif. 94022, and Keith E. Hollenbeck, 847 Tulane Court, Mountain View, Calif. 94040
Division of Ser. No. 518,039, Oct. 25, 1974, Pat. No. 3,948,266, which is a continuation-in-part of Ser. No. 342,508, March 19, 1973, Pat. No. 3,853,125. This application Nov. 24, 1975, Ser. No. 634,369
Int. Cl.[2] A61M *5/30*
U.S. Cl. 128—173 H 2 Claims

1. A method of needleless medicant injection with an after use disposable ampule having a medicant chamber and a bore extending therefrom which is dimensioned for needleless injection, comprising the steps of:
evacuating the medicant chamber in the disposable ampule to less than ambient pressure;
sealing the evacuated chamber to maintain the same at less

than ambient pressure without a medicant for shelf storage;

just prior to an injection, exposing said evacuated and sealed chamber to a contained medicant which is approximately at ambient pressure to transfer such medicant into said chamber; and



just after transferring the medicant into said chamber, exposing the medicant to a higher than ambient pressure to force it through said bore for needleless injection.

4,010,748

BREATHING AIR HUMIDIFIER FOR RESPIRATION DEVICES

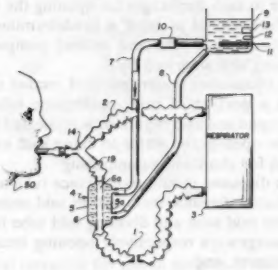
Gunter Dobritz, Lubeck, Germany, assignor to Dragerwerk Aktiengesellschaft, Germany

Filed June 26, 1975, Ser. No. 590,632

Claims priority, application Germany, June 27, 1975, 2430875

Int. Cl.² A61M *16/00*

U.S. Cl. 128—192 **10 Claims**



1. A breathing air humidifier, comprising a respirator air supply conduit having a flexible tubular foil portion of a material impervious to water but pervious to water vapor, a receptacle surrounding said foil portion and defining an annular water chamber therearound, water reservoir means above said receptacle for circulating water to said water chamber, and a Y-piece having three interconnected tubular portions comprising a first tubular portion connectable to the mouth of the user, a second tubular portion connected to the said respirator air supply conduit downstream of said receptacle, and a third tubular portion having a respirator air return connection.

4,010,749

METHOD OF DETECTING INFILTRATION OF INFUSED LIQUID BY COMPARING ALTERED SKIN TEMPERATURE WITH SKIN TEMPERATURE IN AREA OF INFILTRATED LIQUID

Robert F. Shaw, 135 Willowbrook Drive, Portola Valley, Calif. 94025

Filed May 9, 1975, Ser. No. 576,035

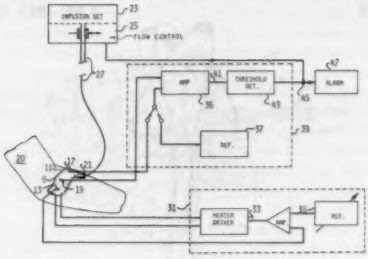
Int. Cl.² A61M *5/00*

U.S. Cl. 128—214 E **3 Claims**

1. The method of detecting liquid-infusion infiltration into the skin of a patient which is at a temperature not sufficiently different from the temperature of the liquid being infused, the method comprising the steps of:

placing a liquid-delivery conduit into a blood vessel of a patient for delivering an infusion liquid into a blood vessel of the patient;

altering the patient's skin surface temperature relative to the temperature of the liquid in a region of the skin overlying the tip of the intravascular portion of the liquid conduit means; and



sensing the difference between the skin surface temperature due to the accumulation of the infused liquid in the perivascular region and the altered skin temperature for providing an output indicative of the difference between the two temperatures.

4,010,750

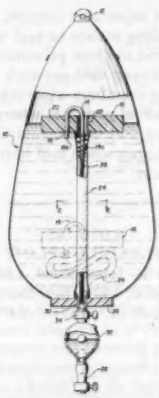
PARENTERAL FLUID ADMINISTRATION SETS

William L. Howell, 3615 Macomb St., Washington, D.C. 20016

Filed Feb. 6, 1976, Ser. No. 656,009

Int. Cl.² A61M *5/16*

U.S. Cl. 128—214 C **11 Claims**



1. A parenteral fluid administration set comprising: a container having a bottom outlet and providing a supply of the parenteral fluid to be administered, a floating siphon adapted to follow the level of the fluid in said container and including a float and at least one siphon U-tube having a shorter and a longer leg, the shorter leg being affixed to and extending through the float body with its fluid-inlet end opening into the fluid in said container, the longer leg of the siphon U-tube extending through an aperture in the float, said longer siphon leg terminating a substantial distance above the container bottom, the fluid outlet end of said longer leg extending into

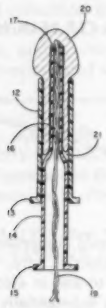
and flowing fluid at a controlled rate to a flow tube affixed at its upper end to said float and at its lower end to said bottom outlet and which extends through the body of fluid in said container and is adapted to dispense said fluid flowing into same through the container bottom to an intravenous tubing line terminating in an infusion needle, said flow tube being fashioned from a material which renders it both non-rigid axially with lowering of the float and collapsible radially under the pressure of the fluid in the container acting thereon along its immersed length, and means disposed within and extending substantially the length of the tube for preventing its complete radial collapse as would block fluid flow through the tube.

4,010,751

INSERTER FOR DELIVERING SOFT, DEFORMABLE TAMPONS INTO BODY CAVITIES AND THE COMBINATION OF A TAMPON THEREWITH

David F. Ring, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Sept. 11, 1975, Ser. No. 612,487
Int. Cl.² A61F *13/20*
U.S. Cl. 128—263 **14 Claims**



1. An inserter device particularly adapted for delivering and depositing a structurally unattached soft, easily deformable catamenial tampon of the type equipped with a withdrawal string into body cavities with the entire inserter being adapted for removal from the cavity after such deposition, said inserter being comprised of an elongate outer element and a unitary elongate inner element in telescoping association, said outer element being in the form of a tube, said inner element having a main portion circumferentially dimensioned for slidable engagement with the inside of said tube, said main portion having on its forward end an integral axially disposed elongate extension, said extension being of smaller diameter than said main portion and said extension being of a length which extends through substantially the full length of said tube when said main portion is in slidable engagement with said tube.

4,010,752

DISPOSABLE DIAPER HAVING A PUFF BONDED FACING LAYER

Thomas Albert Denny, Edison, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Jan. 7, 1976, Ser. No. 647,290
Int. Cl.² A61F *13/16*; B32B *5/16*
U.S. Cl. 128—284 **10 Claims**

1. A disposable diaper comprising:
a moisture-impervious backing sheet,
an absorbent batt having a first face positioned on one face of said backing sheet,
and a facing layer having one face in juxtaposition with the other face of the absorbent batt and adhered to said one face of said facing layer,
said facing layer comprising:
an integral nonwoven fibrous web having a median portion flanked by side portions, said side portions having an overall density substantially lower than that of at least a portion of said median portion and no greater than about

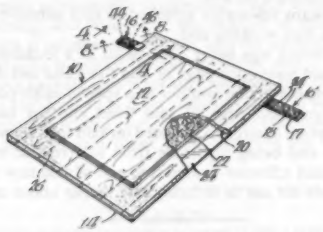
0.02 grams per cubic centimeter, said side portions comprising haphazardly arranged fibers secured together at their junctions by a binder and formed into a cellular structure comprising chambers substantially free of fibers and surrounded by fiber strata.

4,010,753

DISPOSABLE DIAPER HAVING ADHESIVE TAB FASTENERS WITH BUILT-IN RELEASE SYSTEM

Ludwig Tritsch, Wilmette, Ill., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Feb. 19, 1976, Ser. No. 659,314
Int. Cl.² A16F *13/16*
U.S. Cl. 128—284 **15 Claims**



1. A disposable diaper which comprises:
a moisture-impermeable backing sheet forming a diaper outside surface for direction away from an infant when the diaper is worn by that infant;
a moisture-permeable facing sheet which forms a diaper inside surface for direction toward the infant;
an absorbent layer positioned between the backing sheet and the facing sheet;
tab fastener means having side edges, a fixed end secured to said diaper backing sheet, and a free work end, said tab fastener means being provided with a layer of pressure-sensitive adhesive presenting a tacky surface facing in the same direction as the diaper inside surface;
a plurality of elongated spacer means positioned on said tacky surface in a spaced relationship to one another and adhered thereto, and defining a plurality of exposed adhesive regions between said spacer means;
said free working end having a distal end portion which is folded over onto an adjacent central portion of said free working end and releasably secured thereto in a storage position, and juxtaposed spacer means bridging one another and being in limited contact with a juxtaposed region of said tacky surface at a plurality of attachment points when said free working end is folded over.

4,010,754
TAB FASTENER HAVING SUBSTANTIALLY COPLANAR DIVERGING ANCHORING LEGS

Heinz A. Pieniak, Chicago, Ill., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Feb. 4, 1976, Ser. No. 655,047
Int. Cl.² A41B *13/02*
U.S. Cl. 128—287 **12 Claims**

1. A disposable diaper having a facing sheet defining a diaper inside surface for direction toward an infant, a moisture-impervious backing sheet substantially coextensive with said facing sheet and defining a diaper outside surface, an absorbent panel positioned between said facing sheet and said backing sheet, and an adhesive tab fastener means which comprises:

an integral elongated tape segment having a free working end which extends longitudinally to one transverse edge of said tape segment and a fixed end which extends longitudinally from said free working end to an opposite transverse edge of said tape segment, said fixed end having an adhesive coating on one face thereof for permanently attaching said tape segment to said backing sheet at a marginal location thereof, and including at least two substantially coplanar anchoring legs;

a pressure-sensitive adhesive coating on one face of said free working end; and

release means releasably attached to said adhesive coating on said free working end;

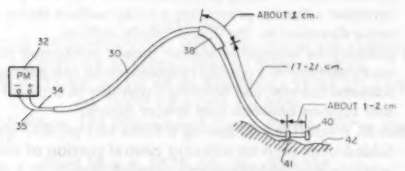
said anchoring legs being contiguous at a location spaced from said transverse edge of said fixed end and diverging with respect to one another to a spaced-apart position at said transverse edge of said fixed end for facilitating distribution of stresses imposed on said tape segment; and

said free end being separable from said release means to make said adhesive-coated free end of said tape segment available for use in securing said diaper about an infant.

4,010,755
UNIPOLAR PACING CATHETER WITH PLURAL DISTAL ELECTRODES

Thomas A. Preston, 820 37th Ave., Seattle, Wash. 98122

Continuation-in-part of Ser. No. 309,996, Nov. 28, 1972, Pat. No. 3,893,461. This application May 27, 1975, Ser. No. 580,876
Int. Cl.² A61N *1/04*
U.S. Cl. 128—404 **8 Claims**



1. Catheter apparatus adapted to be positioned in a patient for use in cardiac pacing of the patient, with a predetermined distal end extending into the patient's heart, comprising:

a. an elongated flexible catheter tube having two conducting leads extending through respective lengths thereof;

b. a proximal electrode of predetermined surface size connected electrically to a first one of said leads;

c. a distal electrode, positioned at about said distal end, having at least two conducting bands surrounding said catheter tube and of respective predetermined surface areas, said bands being positioned within 2 cm of said distal end, each of said conducting bands electrically connected to the second one of said leads, said conducting bands being separated, such that said distal electrode comprises a plurality of electrically connected bands having only non-conducting surfaces therebetween; and

d. said proximal electrode being positioned on said catheter at least 17 cm proximal to said distal electrode.

4,010,756
HEART PACER LEAD WIRE WITH BREAK-AWAY NEEDLE

Jacques DuMont, Asnieres, and Jacques Romagne, Les Essarts le Roi, both of France, assignors to Ethicon, Inc., Somerville, N.J.

Filed Feb. 13, 1976, Ser. No. 657,897
Claims priority, application France, Feb. 14, 1975, 75.04710
Int. Cl.² A61N *1/04*
U.S. Cl. 128—404 **10 Claims**

1. In a surgical electrode comprising

a. an electrically conductive wire,

b. a needle attached to and in electrical contact with said wire and having a substantially straight shank portion adjacent the point of attachment to said wire, and

c. a non-conductive coating over the exterior surface of the wire electrically insulating said wire over a major portion of the length thereof,

the improvement comprising providing a weakened zone in the needle adjacent the straight shank portion of said needle whereby said needle may be readily broken at said weakened zone.

4,010,757
AUXILIARY TOOL FOR REMOVING ELECTRODE FROM HOLDER

James L. Jula, 3880 Oak Terrace, White Bear Lake, Minn. 55110, and Dennis E. Zeidler, 1835 134th Lane NE., Anoka, Minn. 55303

Division of Ser. No. 443,802, Feb. 19, 1974, Pat. No. 3,875,947. This application Jan. 24, 1975, Ser. No. 543,810
Int. Cl.² A61N *1/02*
U.S. Cl. 128—418 **1 Claim**

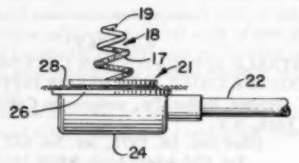
1. An article for removing a body implantable electrode assembly from a device for holding said assembly, said assembly being of the type having an electrically conductive uninsulated distal end portion, a flexible insulated electrical conduc-

tor, and a proximal end thereof adaptable for connection to a power supply, said device including a first means for firmly holding a portion of said electrode assembly near said uninsulated distal end portion thereof, second means adapted to contact an insulated portion of said insulated conductor for releasably holding said conductor to facilitate the screwing of said distal end portion into body tissue and for preventing the transmission of torque to said proximal end of said conductor when said distal end portion is being screwed into body tissue, and third means communicating with said first and second means for allowing said electrode and said conductor to be released from said first and second means by said article, said article comprising a first portion comprising an elongated, substantially cylindrical member dimensioned to be moveable in said third means, a second portion dimensioned to be moveable in said second means, said second portion comprising a ridge member extending substantially entirely along the length of said first portion and parallel to the longitudinal axis of said first portion, and a third portion dimensioned to be moveable in said first means comprising a cone-shaped member attached to one end of and in axis alignment with said first portion, said second portion having an upwardly inclining, leading edge commencing proximate the junction of said first and third portions, whereby movement of said article into operative position removes said assembly from said first and second means, and said cylindrical member of said first portion further having aperture means located in the end remote from said third portion, said aperture means being dimensioned to receive said proximal end of said assembly.

4,010,758
BIPOLAR BODY TISSUE ELECTRODE

Ronald H. Rockland, Wayzata, and David H. Gobeli, St. Paul, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.

Filed Sept. 3, 1975, Ser. No. 610,063
Int. Cl.² A61N 1/04
U.S. Cl. 128—418 **14 Claims**

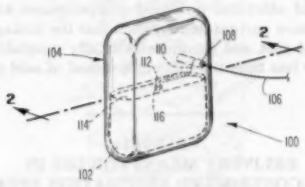


1. A heart tissue implantable bipolar electrode assembly for disposition within a living animal comprising:
   a. first and second insulated, flexible conductors, each having a proximal end adapted to be connected to an energizing source and a distal end;
   b. a first conductive, rigid, helically-shaped electrode adapted to be rotatively inserted within the tissue and having a proximal end electrically connected to said distal end of said first conductor;
   c. an inert insulating covering disposed about said first electrode leaving a limited portion thereof exposed;
   d. a second conductive, annularly-shaped electrode disposed about said first electrode and being electrically connected to said distal end of said second conductor, said second electrode having a substantially flat surface adapted for intimate contact with the tissue; and
   e. insulating housing means for mounting said second electrode in a spaced, insulated manner with respect to said first electrode and to dispose said limited portion of said first electrode in a spaced relationship from said flat surface so that said first electrode may be fully inserted within the tissue and said second electrode be in electrical contact with the surface of the tissue, whereby a relatively intense electrical field is established through the tissue between said exposed portion of said first electrode and said second electrode.

4,010,759
INSULATED, CORROSION RESISTANT MEDICAL ELECTRONIC DEVICES AND METHOD FOR PRODUCING SAME

Gerard B. M. Boer, Dieren, Netherlands, assignor to Vitatron Medical B.V., Dieren, Netherlands

Filed Aug. 29, 1975, Ser. No. 608,894
Int. Cl.² A61N 1/36
U.S. Cl. 128—419 P **34 Claims**



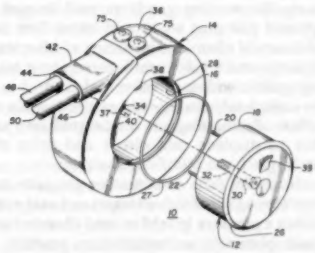
1. An insulated, corrosion-resistant pacer for rhythmically stimulating heart muscle, comprised of:
   a. a hermetically sealed case;
   b. electronic circuit means for producing a rhythmic heart muscle stimulating negative output pulse, said electronic circuit means being disposed within said case and including a power source providing an operating voltage;
   c. output means for conducting said output pulse from said electronic circuit means to outside of said case, said output means extending from within said case to a terminal outside of said case and comprising a tantalum centerpin disposed through said case and a tantalum feed wire welded to said centerpin, and having an anodically formed substantially continuous Ta_2O_5 insulating layer covering said feed wire, the portion of said centerpin which is outside of said case, and the surface where said feed wire is welded to said centerpin; and
   d. epoxy capsule means for surrounding said output means;

whereby said insulating layer reduces electrical leakage from said conductor to said case, and whereby said insulating layer further protects said pacer from corrosive and electrolytic attack.

4,010,760
COUPLING ASSEMBLY FOR IMPLANTABLE ELECTROMEDICAL DEVICES

Robert E. Kraska, Minneapolis, and Pieter M. J. Muller, St. Paul, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.

Filed May 23, 1975, Ser. No. 580,042
Int. Cl.² A61N 1/36
U.S. Cl. 128—419 PS **14 Claims**



1. A body implantable electromedical device of the type

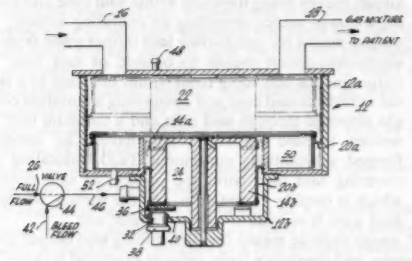
having electrical potential source means for developing a predetermined potential and an electrical current, generating means adapted to receive and responsive to the current from said potential source means for generating a tissue stimulating signal, lead means adapted to be coupled with said generating means for transmitting said signal to a remote situs, and at least one coupling assembly for detachably coupling said electrical potential source means to said generating means comprising at least first and second electrically couplable units each comprising first and second members, said first unit being adapted to be at a higher electrical potential than said second unit, at least said first and second members of said first unit being composed of a material having an electrochemical breakdown potential in excess of the electrical potential provided by said electrical potential source means and further having a passive current density such that the leakage current between said first and second electrically couplable units is substantially less than the current demand of said generating means.

4,010,761

DELIVERY MEANS FOR USE IN VOLUME-CONTROLLED RESPIRATION APPARATUS

Neil A. Tipple, Redondo Beach, Calif., assignor to Puritan-Bennett Corporation, Santa Monica, Calif.

Filed Nov. 10, 1975, Ser. No. 630,083
Int. Cl.² A61M *16/00*
U.S. Cl. 128—145.6 **13 Claims**



1. Gas delivery apparatus for use with a respirator system, said apparatus comprising:

a cylinder;

a piston slidably mounted in said cylinder;

sealing means affixed to said cylinder and to said piston, effectively dividing said cylinder into first and second chambers, said first chamber having connected thereto an input line for admitting a gas mixture to be delivered to a patient and an output line for delivering a desired volume of the gas mixture to the patient on movement of said piston, and said second chamber having an exit port therein;

means for admitting an initial flow and a subsequent flow of actuating gas into said second chamber;

valve means for venting gas from said second chamber, through said exit port when said initial flow is admitted into said second chamber, including a valve seal attached to said piston and a valve seat located about said exit port and engageable with said valve seal; and

means for completely sealing said exit port when said subsequent flow of actuating gas is admitted into said second chamber to displace said piston and drive the desired volume of gas from said first chamber;

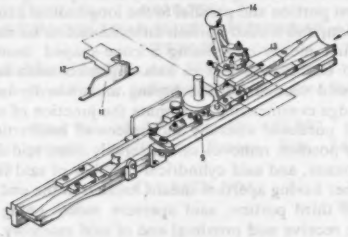
whereby the initial flow of actuating gas exits said second chamber through said valve means and said exit port, and establishes a pressure in said second chamber sufficient to hold said piston in an equilibrium position, with said sealing means being prestressed by the pressure in said second chamber, to minimize volume errors, and said piston being movable in rapid response to further increase in the actuating pressure when said exit port is completely sealed by said sealing means.

4,010,762

CIGARETTE ROD CONDITION DETERMINING

Mauritz Leon Strydom, Stellenbosch, South Africa, assignor to Tobacco Research and Development Institute Limited, Zug, Switzerland

Continuation-in-part of Ser. No. 529,869, Dec. 4, 1974, abandoned. This application May 13, 1976, Ser. No. 685,957
Claims priority, application South Africa, Dec. 11, 1973, 73/9394; Aug. 21, 1974, 74/5369
Int. Cl.² A24B *7/14;* A24C *5/32*
U.S. Cl. 131—21 B **6 Claims**



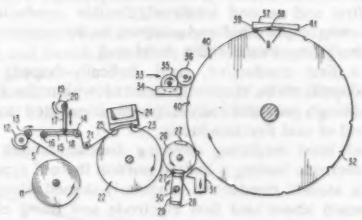
1. In a rod making machine comprising means to forward material such as tobacco from which a rod is to be made in the form of a stream along a predetermined path, and a throat along the path in which material is compressed to rod-shape as it is forwarded along the path, the improvement that the throat comprises at least one curved elongated segment free on all sides from the other throat components, a cantilever arm fixed at one end to the machine and at the other end to the segment, a strain gauge mounted on the cantilever arm between the machine and the segment, and means to detect the output of the strain gauge.

4,010,763

ADJUSTABLE APPARATUS FOR CUTTING WRAPPERS FOR DOUBLE CIGAR BUNCHES OF DIFFERENT SIZES

Hans C. Dreher, Dallas, Pa., assignor to Culbro Corporation, New York, N.Y.

Filed Dec. 18, 1975, Ser. No. 641,732
Int. Cl.² A24C *1/26;* B23D *25/12*
U.S. Cl. 131—33 **30 Claims**



1. Apparatus for dispensing a continuous sheet in the form of V-shaped segments of predetermined width measured along the length of said sheet which comprises adjustable means for feeding said sheet at a predetermined rate, a rotatable suction drum for holding the leading end of said sheet thereon, at least one V-shaped knife blade projecting slightly from the cylindrical surface of said suction drum into contact with said leading end of said sheet, a V-shaped narrow cutting anvil projecting slightly from the concave face of a block fixed relative to said suction drum so that all of said V-shaped knife blade passes in

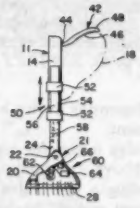
substantially instantaneous rubbing contact with said V-shaped anvil during the rotation of said suction drum, and means for removing from said suction drum each V-shaped segment cut from said sheet by the passage of said V-shaped knife blade covered with said leading end of said sheet in rubbing contact with said V-shaped anvil.

4,010,764

SIDEBURN TRIMMING GUIDE

Stan Wagner, 880 Van St., London, Ontario, Canada

Filed May 10, 1976, Ser. No. 684,584
Int. Cl.² A45D *24/36*
U.S. Cl. 132—45 R **7 Claims**



1. A sideburn trimming guide comprising:

a flexible arcuate band element for placement on the top portion of the user's head, the free ends of said band element biased inwardly and resting in front of and adjacent to the user's ears;

first adjusting means for adjusting the length of said band element;

a pair of guide means for providing a pair of guide lines for guiding a cutting implement in cutting the user's sideburns, said guide lines spaced a variable distance from the location of said band;

second adjusting means for adjusting the position of said guide lines said variable distance from said band element;

a pair of positioning elements each affixed on one end thereof to said band element adjacent each of said user's ears, the portion adjacent the other ends of said positioning element for resting on said ears positioning said free ends of said band element at a fixed distance relative to said ears; and

illumination means attached to said guide means adapted to illuminate said sideburns adjacent said guide lines.

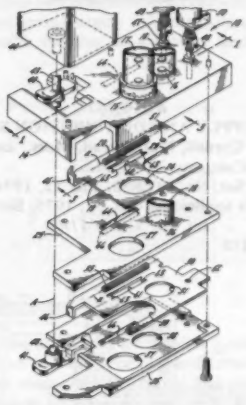
4,010,765

COIN CHANGER WITH SPRING-BIASED SLIDES

Howard W. Clay, Rockford, Ill., assignor to Reed Industries, Inc., Rockford, Ill.

Filed Mar. 1, 1976, Ser. No. 662,322
Int. Cl.² G07D *1/02*
U.S. Cl. 133—4 A **8 Claims**

1. A coin changer having a coin payout mechanism, said mechanism comprising a base, first and second coin storage tubes supported on said base, a first slide underlying said base and reciprocable horizontally back and forth in a linear path beneath said base from a home position to a payout position, a stationary divider plate underlying said first slide, a second slide underlying said divider plate and reciprocable horizontally back and forth in a linear path beneath said divider plate from a home position to a payout position, a stationary bottom plate underlying said second slide, each of said slides being operable when moved from its home position to its payout position to discharge a coin from its respective coin tube and through said bottom plate, a power operated cam means rotatable about a vertical axis and operable when actuated through one payout cycle to release said slides for movement to said payout positions and then to return to said home position any slide which has been moved to said payout position, the improvement in said coin changer comprising, first and second coiled compression springs for moving said first and second slides, respectively, to said payout positions, each of said springs having an axis substantially intersecting the rotational axis of said cam means and extending parallel to the linear path followed by the respective slide, said first spring being disposed within an opening in said first slide and having



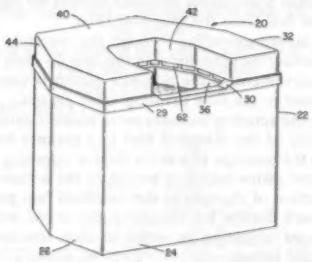
one end engageable with said first slide and an opposite end engageable with said base and said divider plate, and said second spring being disposed in an opening in said second slide and having one end engageable with said second slide and an opposite end engageable with said divider plate and said bottom plate.

4,010,766

CHANGE DISPENSING APPARATUS

Ralph F. Bowles, Ithaca, and Arthur Hartvig, Spencer, both of N.Y., assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 8, 1975, Ser. No. 638,877
Int. Cl.² G07D *1/00*
U.S. Cl. 133—4 A **20 Claims**



1. A change dispensing apparatus comprising:

a. a coin channel mounted in a generally vertical direction and adapted to receive coins to be dispensed, said coin channel having a top orientated discharge end;

b. means for moving coins in the coin channel to a coin dispensing position at said discharge end;

c. a coin retaining means disposing adjacent the discharge end;

d. means extending in a generally horizontal direction from the discharged end of said coin channel to said coin retaining means to guide coins dispensed from said coin channel to said coin retaining means;

e. coin delivery means selectively positioned adjacent the top of the discharge end of the coin channel to dispense a coin from said discharge end through said guide means to said coin retaining means when operated;

f. and means operatively associated with said delivery means to selectively operate said delivery means.

4,010,767

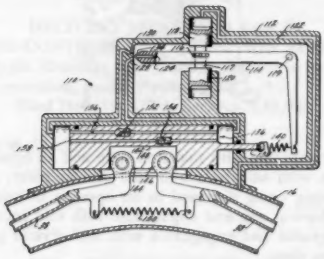
FUEL SUPPLY AND DISTRIBUTION SYSTEM

Richard Henry Cornell, Marblehead, Mass., assignor to General Electric Company, Lynn, Mass.

Division of Ser. No. 487,888, July 12, 1974, Pat. No. 3,949,775. This application Oct. 31, 1975, Ser. No. 627,728

Int. Cl.² G05D *11/00*

U.S. Cl. 137—118 **2 Claims**



1. A fuel supply and distribution system comprising:

an annular manifold tube for receiving a flow of pressurized fuel,

an actuator having a piston slidably disposed therein wherein the piston is actuated in response to changes in the pressure of the fuel in the manifold tube,

a plurality of flow dividing valves disposed about the circumference of the manifold tube each including a metering piston translatably disposed therein for regulating the flow of fuel from the manifold tube,

linkage means extending through the manifold tube interconnecting the actuator with the flow dividing valves such that movement of the actuator piston is simultaneously imparted to the flow dividing valve pistons,

wherein the actuator includes servo means controlled by the pressure of the manifold fuel in a manner which unbalances the pressure of a servo fluid at opposing ends of the actuator piston and thus translates the actuator piston as a function of changes in the manifold fuel pressure, and feedback means for returning the servo means to the balanced condition in order to stop translation of the actuator piston,

wherein the servo means includes a bell crank type jet pipe servo rotatably disposed with respect to the actuator for discharging a jet of pressurized servo fluid wherein rotation of the jet pipe is controlled by rotatable and sliding engagement to a rod interconnecting two spaced apart pistons both of which are disposed for translation relative to the actuator with the head side of one piston pressurized by fuel received from the manifold and the head side of the other piston pressurized by the gaseous mixture from the combustor, and further includes spaced apart receiver passages for receiving the servo fluid from the jet pipe and directing it to pressurize opposing sides of the actuator piston;

and wherein the feedback means includes a resilient connection between the actuator piston and jet pipe so as to impart a torque to the jet pipe servo counter to that imposed by a change in fuel manifold pressure.

4,010,768

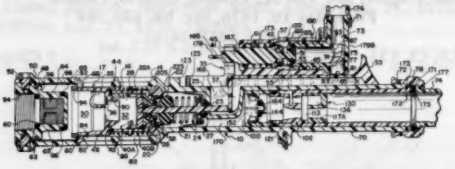
TWO-STAGE JET PUMP PROPORTIONER

Valentine Hechler, IV, 26 Meadow View Road, Northfield, Ill. 60093

Division of Ser. No. 520,676, Nov. 4, 1974, which is a continuation-in-part of Ser. No. 443,831, Feb. 27, 1974, Pat. No. 3,933,179. This application Dec. 10, 1975, Ser. No. 639,310

Int. Cl.² F16K *19/00*

U.S. Cl. 137—218 **16 Claims**



1. In a mixture dispensing device having a housing defining a mixing compartment;

normally open valve means for conducting solvent to said compartment above a comparatively low positive gauge pressure including a vent valve and flow control valve closed by solvent present having a pressure above said low positive gauge pressure;

manual means for actuating the solvent valve means above said low pressure and the solute valve means simultaneously therewith; and,

jet pump mixing means in said compartment inducing said lower pressure by confluent flow of said solvent and solute for mixing said solvent and solute in a solution of predetermined portions.

4,010,769

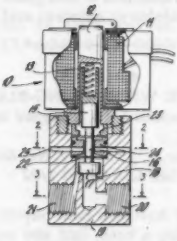
LEAK DETECTION ARRANGEMENT FOR VALVE HAVING SEALING MEANS

Bruce L. De Lorenzo, and Daniel J. McCarthy, both of Clifton, N.J., assignors to Plast-O-Matic Valves, Inc., Totowa, N.J.

Continuation of Ser. No. 309,903, Nov. 27, 1972, abandoned. This application Nov. 25, 1974, Ser. No. 526,991

Int. Cl.² F16K *31/06*, *41/12*

U.S. Cl. 137—312 **3 Claims**



1. Valve construction comprising:

actuating means,

a valve body having a fluid inlet passage and a fluid outlet passage, a valve seat between said inlet and outlet passages and a cavity above the valve seat,

a valve flow control plunger operatively arranged between the actuating means and the valve seat and extending through the cavity in the valve body and responsive to the actuating means for movement relative to the valve seat for correspondingly controlling fluid flow through the valve seat from the inlet passage to the outlet passage,

spaced apart first and second diaphragms correspondingly secured between the plunger and the valve body for sealing against fluid flow to the actuating means, the

second diaphragm sealing against fluid flow along the plunger beyond the first diaphragm,

a leak detection passage extending from the interior of the valve body outwardly to the exterior thereof and located between the first and second diaphragms for the flow of any fluid leaking past the first diaphragm to a visible location outside of the valve body, and

a spacer in the cavity surrounding the plunger and located between the first and second diaphragms and having an opening therethrough defining a portion of the detection passage.

4,010,770

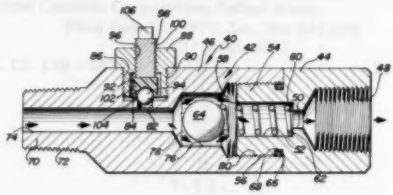
VELOCITY FLOW CONTROL VALVE FOR FLUID LINE

Clifford M. Peters, Longview, Tex., assignor to W-K-M Wellhead Systems, Inc., Shreveport, La.

Filed Mar. 1, 1976, Ser. No. 662,312

Int. Cl.² F16K *31/12*

U.S. Cl. 137—492.5 **5 Claims**



1. In a safety system for closing a gate valve in a main flow line having a fluid actuator for closing the gate valve, a pilot valve to control the flow of fluid to the actuator, and a branch line between the main flow line and the pilot valve to supply fluid pressure from the main flow line to the pilot valve, the improvement comprising a velocity flow control valve in the branch line adjacent the main flow line, said flow control valve having a longitudinal extending main body including two body portions threaded together in end-to-end relation to form an upstream female body portion and a downstream male body portion both having a central bore therethrough forming a flow passage, said downstream male body portion having a ball valve seat on its inner end about the central bore and a coil spring within the central bore and extending beyond the valve seat, a ball valve member on the extending end of the spring adapted to seat on the ball valve seat and block the flow of fluid therethrough when urged against the bias of the spring by a predetermined pressure differential, said upstream female body portion having an enlarged inner end forming a valve chamber for receiving the ball valve and permitting a flow of fluid around the ball valve when in an unseated position, said female body portion having a bleed port in fluid communication with the bore upstream of the valve chamber, and a bleed valve closing said bleed port in one position and permitting in another position the bleeding of fluid from the bore.

4,010,771

CHANGE-OVER VALVE, PREFERABLY FOR A RAILWAY VEHICLE

Gert Artur Persson, Oxie, Sweden, assignor to Svenska Aktiebolaget Bromsregulator, Malmo, Sweden

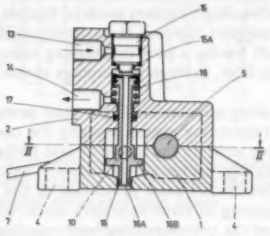
Filed July 8, 1974, Ser. No. 486,580

Claims priority, application Sweden, July 11, 1973, 7309716

Int. Cl.² B60T *8/18*

U.S. Cl. 137—596.1 **4 Claims**

1. A change-over valve operating mechanism operable by an applied force such as the weight of a vehicle, comprising in combination, means providing a flow path from an input fluid flow coupling to an output fluid flow coupling, a fluid control valve connected in said path for permitting flow of fluid under pressure through said path in one position and preventing flow of fluid to said output coupling in a further position, said valve having a member movable to two different positions respectively, and a control device operating said fluid control valve member in either of said positions comprising, a rotary mechanism rotatable in response to said applied force for moving said valve to said two positions as a function of said applied force, a return spring urging said mechanism in a position placing the valve member in a first of said two positions,



structure coupling said rotary mechanism to said spring so that in response to an applied force of pre-determined magnitude the mechanism overcomes the spring and permits the valve member to move into the second of said two positions, wherein the structure limits the applied pressure on the valve to the force of said spring and having said fluid control valve spring biased by a spring less powerful than said return spring, whereby said less powerful spring urges said fluid control valve into said position permitting flow of fluid through said path when said rotary mechanism overcomes the return spring.

4,010,772

TWO PART LIP SEALING MIXING VALVE FOR LAVATORIES, SINKS, ETC.

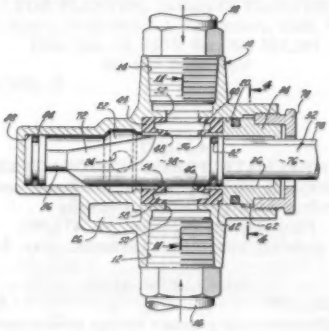
Patsy B. Palmer, Granada Hills, and Julius L. Tolnai, Los Angeles, both of Calif., assignors to Price Pfister Brass Mfg. Co., Pacoima, Calif.

Continuation of Ser. No. 241,653, April 6, 1972, abandoned, which is a continuation-in-part of Ser. No. 95,506, Dec. 7, 1970, Pat. No. 3,661,181. This application Feb. 21, 1975, Ser. No. 551,673

The portion of the term of this patent subsequent to May 9, 1989, has been disclaimed.

Int. Cl.² F16K *19/00*

U.S. Cl. 137—625.17 **2 Claims**



1. In a mixing valve structure:

a. a valve body having means forming a substantially cylindrical valve chamber;

b. means forming hot and cold water inlet openings into the chamber at angularly spaced locations thereof;

c. a valve stem extending into said chamber and having a substantially cylindrical exterior surface portion movable to oppose said inlet openings;

d. a cage-like support attached to said body and having a hollow, substantially cylindrical portion interposed between said inlets and said valve stem, said cylindrical portion having a pair of angularly spaced, outwardly facing recesses respectively facing the hot and cold water inlets respectively, said recesses having inner walls provided with openings to the interior of said hollow portion for communication with said valve stem;

e. a pair of sealing members made of flexible material fitted in said support recesses respectively, said sealing members each having a port establishing communication between its inlet, through the support recess opening to the stem;

f. each sealing member having a bead protruding through the corresponding recess opening for cooperation with said valve stem on the inside of said hollow portion;

g. said sealing members respectively extending entirely about the inward axial projection of the corresponding inlet opening to form operative static seals around the insides of the corresponding inlet openings;

h. each of said ports having an intermediate recessed enlargement forming an atrium subjected to supply inlet pressure to expand the sealing member into sealing engagement with the edges about the corresponding inlet opening and to urge the corresponding bead into sealing engagement with said cylindrical surface portion of said stem when the stem is in closed position;

i. said valve stem having flow channel means adjoining the cylindrical surface portion to control flow into said valve chamber from the inlet openings in accordance with the angular and axial positions of said valve stem;

j. said sealing members forming the only operable static and dynamic seals between said inlet openings and the exterior surface of said valve stem.

4,010,773

HYDROPNEUMATIC PRESSURE STORAGE DEVICE

Eugen Bihlmaier, Birkmannsweiler, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

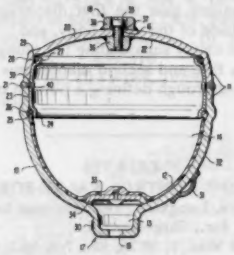
Filed May 21, 1974, Ser. No. 471,901

Claims priority, application Germany, May 22, 1973, 2325844

Int. Cl.[2] F16L *55/04*

U.S. Cl. 138—30 **29 Claims**

1. A hydropneumatic pressure storage device comprising a housing means having two parts welded together by a welding seam, a retaining ring means arranged at the inner wall of said housing means within the area of the welding seam, means for fixing said retaining ring means in said housing means, a bellows means serving as a movable partition wall, said retaining ring means holding said bellows means in said housing means, and a weld rejectable layer of a material for rejecting the welding material of said welding seam, said layer being disposed at least at a portion of said retaining ring means adja-



cent said welding seam, such that said retaining ring means is unbonded of said welding seam.

4,010,774

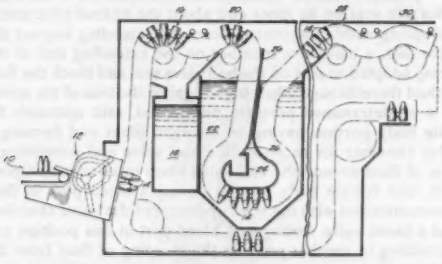
ROTARY SPRAY STATION FOR BOTTLE WASHERS

Otto H. Fischer, Milwaukee, Wis., assignor to Stowell Industries Inc., Milwaukee, Wis.

Filed Mar. 3, 1975, Ser. No. 554,905

Int. Cl.[2] B08B *3/02*, *9/08*

U.S. Cl. 134—104 **2 Claims**



1. A bottle washing machine of the type having a conveyor transporting bottles through the machine in parallel rows, the bottles in each row being spaced and supported to remain normal to the conveyor on straight runs of the conveyor and to be radially disposed where the conveyor follows a curved path, the improvement comprising a spray station located where the conveyor follows a curved path with the necks of the bottles facing the center of curvature,

the bottles in each row being angularly spaced at the spray station,

a pipe at the spray station rotated in synchronism with the conveyor drive,

axially spaced rows of circumferentially disposed nozzles mounted on the pipe in alignment with the rows of bottles on the conveyor,

the angular spacing of the nozzles in each row corresponding to the angular spacing of the bottles passing over the

curved spray station with each nozzle being aligned with a bottle as the bottle passes the spray station so the spray from the nozzle is aligned with the bottle for the angular embrace of the bottle travel over the curved path,

pump means delivering liquid under pressure to the interior of the pipe,

a stationary header embracing a circumferential portion of said pipe and substantially blocking spray from the nozzles as they travel outside said angular embrace, said header including a normally inoperative flow path which, when operative, permits liquid under pressure to be injected through each nozzle in the reverse direction as the nozzle is aligned with the flow path,

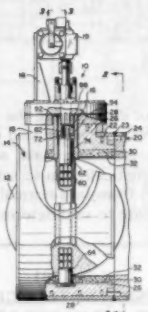
and means for rendering the flow path operative and permitting the liquid to be withdrawn from the interior of said pipe.

4,010,775

HIGH TEMPERATURE VALVE

Richard Albert Roberts, Corona, Calif., assignor to Consolidated Controls Corporation, Bethel, Conn.

Filed Jan. 15, 1975, Ser. No. 541,254
Int. Cl.² F16L *9/14*
U.S. Cl. 138—142 **29 Claims**



1. An abrasion resistant conduit for conveying high temperature abrasive fluids such as coal gas and the like comprising an outer shell of metal, an outer liner of castable refractory material having a relatively unsmooth surface cast in place in said shell, and a flame sprayed inner liner of ceramic material on an inside surface of said outer liner to provide a smooth inner surface of said outer liner and to provide a smooth surface for contact with said abrasive fluids.

4,010,776

TAPE WHEEL FOR SHUTTLELESS LOOMS

Maurice Flamand, Cumberland, R.I., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Nov. 28, 1975, Ser. No. 635,875
Int. Cl.² D03D *47/18*
U.S. Cl. 139—449 **5 Claims**

1. An improved tape wheel for use in a shuttleless loom in which flexible tapes are inserted into and withdrawn from the warp shed by being wrapped about and extended from said tape wheel respectively, said improved tape wheel comprising:

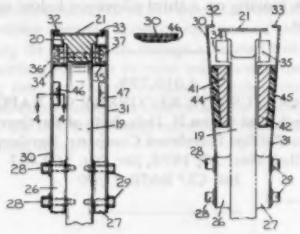
a. hub means journalled for effecting oscillation of said tape wheel;

b. a plurality of spoke members extending outwardly from said hub means;

c. outer rim means supported by said spoke members with attachment means for anchoring one end of a flexible tape thereto;

d. means carried by said spoke members for retaining the flexible tape in close proximity with said outer rim means; and

e. means operatively associated with said retaining means and spoke members for sequentially displacing said retaining means to release the flexible tape while it is being



extended from said tape wheel, and sequentially returning them to tape retaining position while the flexible tape is being wrapped about said tape wheel.

4,010,777

METHOD FOR THE ACHIEVEMENT OF AN ACETYLENE GAS MIXTURE

Sten Mogensen, Djursholm, Sweden, assignor to AGA Aktiebolag, Lidingo, Sweden

Continuation-in-part of Ser. No. 397,141, Sept. 13, 1973, abandoned. This application June 4, 1975, Ser. No. 583,751
Claims priority, application Sweden, Sept. 19, 1972, 12050/72
Int. Cl.² B65B *31/00*
U.S. Cl. 141—4 **5 Claims**

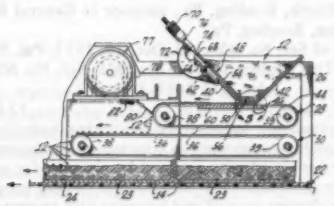
1. A method for safely storing increased amounts of acetylene in a gaseous state in closed containers, while reducing the tendency of said acetylene to decompose, which comprises adding a liquid solvent for said acetylene to said container, adding said acetylene to said containers, and adding a sufficient amount of flammable, stable gas selected from the group consisting of the C_1 to C_5 alkanes, alkenes, and mixtures thereof to said container to act as a solvent for said acetylene, whereby the total amount of said acetylene which can be safely stored in said acetylene-filled closed container is increased by about 10 to 15% by the addition of said flammable, stable gas.

4,010,778

AUTOMATIC SEED PLANTING MACHINE AND METHOD FOR PLANTING SEEDS IN PLANTERS

Alvin F. Aggen, 2750 Sailor Ave., Ventura, Calif. 93003

Filed Jan. 10, 1973, Ser. No. 322,391
Int. Cl.² B65B *3/04*
U.S. Cl. 141—9 **3 Claims**



1. The method of planting seeds of a predetermined size uniformly in flats comprising the steps of:

dispensing seeds from a supply in a hopper in single height, side-by-side, and closely spaced relation onto a first conveyor;

dropping said seeds from said first conveyor to a second conveyor positioned therebelow;

moving said second conveyor at a speed faster than that of said first conveyor thereby to space out said seeds dropped onto said second conveyor; and

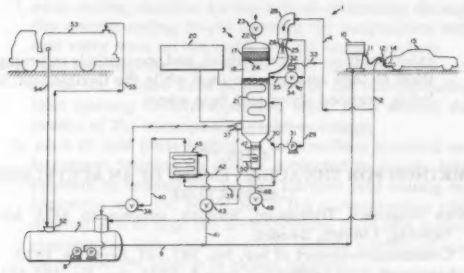
dropping said seeds from the end of said second conveyor into flats moving on a third conveyor below said second conveyor.

4,010,779

APPARATUS FOR RECOVERY OF VAPOR

Lyle W. Pollock, and Glenn H. Dale, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 20, 1975, Ser. No. 560,402
Int. Cl.² B65B *31/00*
U.S. Cl. 141—44 **8 Claims**



1. An apparatus for recovery of vapor expelled from a tank during filling of same, said apparatus comprising:

a. a storage tank;

b. a first conduit having a first end adapted to receive vapor from a tank being filled, said first conduit being in continuous flow communication with said storage tank;

c. a second conduit in continuous open flow communication with said first conduit;

d. liquefaction means communicating with said second conduit and operable to receive vapor from said first conduit through said second conduit for liquefying same; and

e. first means operably associated with said liquefaction means and said first means including a pressure sensing means operably associated with at least one of said first conduit and said second conduit and also operably associated with said liquefaction means and being operable in response to a pressure change in one of said first and second conduits for selectively actuating a liquefying portion of said liquefaction means whereby at least a portion of the vapor selectively flows to the liquefaction means.

4,010,780

ACID FILLING APPARATUS FOR BATTERIES OR THE LIKE

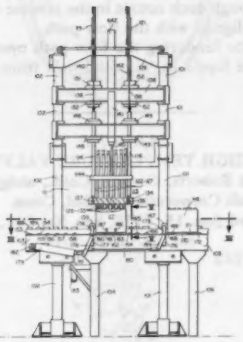
William J. Eberle, Reading, Pa., assignor to General Battery Corporation, Reading, Pa.

Division of Ser. No. 423,317, Dec. 10, 1973, Pat. No. 3,934,624. This application July 28, 1975, Ser. No. 600,153
Int. Cl.² B65B *3/06*
U.S. Cl. 141—168 **13 Claims**

8. In a system for sequentially processing batteries with battery processing equipment, an apparatus for retaining each of said batteries in at least one stand-by position, for advancing each of said batteries to at least one battery processing position, for aligning each of said batteries with respect to said battery processing equipment during the operation of said equipment, and for allowing the discharge of each of said batteries from said battery processing position, comprising:

a. a conveyor surface defined by a plurality of transverse rolers, at least two of which rollers which are spaced apart by a distance at least as great as the longitudinal dimension of said batteries to be processed being adapted for movement with respect to said surface between first normal positions and second stop positions, whereby longitudinal movement of at least two of said batteries along said surface is halted at said standby and said battery processing positions by said rollers in said stop positions;

b. actuator means for causing said rollers to move in unison between said normal and said stop positions; and



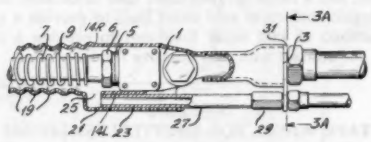
c. sensing means for determining the presence of a battery during its movement between said standby and said battery processing positions, said sensing means being adapted to automatically cause said actuator means to move said rollers from said normal position to said stop position in response to said determination.

4,010,781

GASOLINE DISPENSING NOZZLE GUARD WITH SPOUT ENCLOSURE AND VAPOR RETURN LINE

Grenville G. Sutcliffe, Villa Ridge, Mo., assignor to Husky Corporation, Pacific, Mo.

Filed Mar. 31, 1975, Ser. No. 563,808
Int. Cl.² B65B *3/04*
U.S. Cl. 141—392 **8 Claims**



1. The combination of a fuel dispensing nozzle having a body with an elongated inlet passage and an outlet mounting an elongated spout insertible into the filler opening of a fuel tank for discharging fuel thereinto, with a guard comprising a body portion having a front wall, spaced side walls, a top wall and a bottom wall and open at its rear, adapted to fit tightly over and substantialy enclose the nozzle body, a hollow projection extending forwardly from said front wall and adapted to surround the elongated nozzle spout in spaced relation with the exterior thereof and open at its forward end to engage structure surrounding the fuel tank filler opening, an elongated boss on one side wall extending from the rear portion of said hollow projection to the rear edge of said body portion, said boss being hollow and forming a passageway communicating at its forward end directly with the interior of said hollow projection and open at its rear end, and a vapor return tube alongside the nozzle inlet passage with its forward end telescopingly received in said passageway, said nozzle inlet

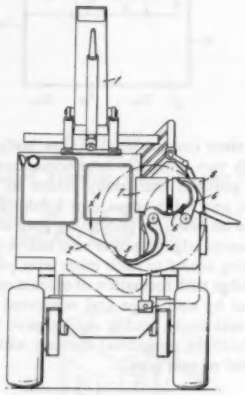
passage having an opening at its rear end adapted to receive a fuel hose fitting, and a plate transverse of said inlet passage apertured to permit the passage therethrough of said hose fitting and adapted to be gripped between said hose fitting and the abutting rear end of said nozzle body, said plate being formed with a second aperture radially spaced from said first aperture to receive and position said vapor return tube.

4,010,782

METHOD AND DEVICE FOR FEEDING TREES IN TREE HARVESTING APPARATUS

Jukka Moisander, Tampere, Finland, assignor to Rauma-Repola Oy., Finland

Filed Jan. 5, 1976, Ser. No. 646,552
Claims priority, application Finland, Jan. 16, 1975, 750107
Int. Cl.² A01G *23/08*
U.S. Cl. 144—309 AC **3 Claims**



3. In a multifunctional tree-harvesting apparatus having tree-felling means, means for delivering felled trees to the input end of the apparatus, and a handling line for felled trees including tree-pulling means and lopping knives:

a. a tree supporting member mounted on a lower portion of the input end of the apparatus for receiving and supporting the butt end of a felled tree, said support member forming a holding and storing means for said felled tree awaiting handling;

b. an upwardly-inclined, sideward, beam-like extension on said tree supporting member for receiving and supporting additional felled trees and for permitting said additional felled trees to successively slide onto said tree supporting member;

c. first delimbing means rigidly mounted at the input end of the apparatus along the handling line, said first delimbing means having a cutting edge and a configuration for encircling a portion of the circumference of the trunk of a tree in the handling line;

d. second delimbing means adjacent said first delimbing means, said second delimbing means having cutting edges and being pivotably mounted for reciprocating movement through an arc sufficient to contact said trunk and so placed as to encircle a portion of the circumference of the trunk of said tree in the handling line adjacent the portion encircled by said first delimbing means; and

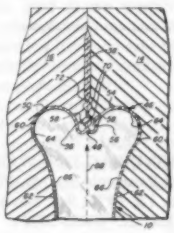
e. third delimbing means having cutting edges and a scoop-like configuration mounted at the input end of the apparatus for unobstructed, continuous rotation through a full circle about a substantially horizontal axis extending in the longitudinal direction of the apparatus, said axis of rotation being disposed below the handling line and above the tree supporting member, the length of said third delimbing means being sufficient to extend beneath the butt end of a felled tree on said tree-supporting member, whereby, upon rotation, said third delimbing means raises said butt end of the tree to feed it into the pulling means in the handling line while encircling a third portion of the circumference of the trunk for delimbing, said third delimbing means, upon completion of delimbing, continuing its rotation to engage a second tree on the three supporting member to raise said second tree to the handling line, said continuously rotatable third delimbing means constituting the sole means for raising a felled tree from the tree supporting member to feed said tree to the handling line.

4,010,783

FLEXIBLE, COLLAPSIBLE CONTAINER FOR LIQUIDS HAVING REINFORCED TAIL PORTION

Philip G. Ralston, Woodstock, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed July 21, 1975, Ser. No. 597,426
Int. Cl.² B65D *33/02*
U.S. Cl. 150—1 **8 Claims**



1. In a flexible-walled, flat-collapsible container including a sealed head portion with access means to the contents of the container, and a tail portion defining a sealed line joining sides of said container into a sealed end, the improvement comprising:

said sealed line occupying a recess defined in said sealed end by said flexible container walls, said sealed line and recess extending essentially the entire width of said container, whereby outwardly-directed shock is absorbed by movement of the walls of said recess to protect said sealed line from rupture, said sealed line being free of extra seal-reinforcing means.

4,010,784

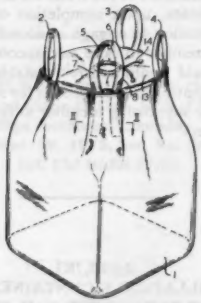
BULK CONTAINERS

Frank Nattrass, "Fallows End", Brearton, Harrogate, Yorkshire, and Peter Johnson Nattrass, "Tresco", Chain Lane, Knaresborough, Yorkshire, both of England

Continuation-in-part of Ser. No. 454,870, March 26, 1974, abandoned. This application Oct. 15, 1975, Ser. No. 622,740
Claims priority, application United Kingdom, Mar. 4, 1973, 15798/73
Int. Cl.² B65D *33/14*
U.S. Cl. 150—1 **18 Claims**

1. A bag for transporting bulk material, the bag having a top and having four separate lifting loops disposed around the top, each loop having a bight and two spaced legs, and each leg being secured to the fabric of the bag by being disposed along a section of the fabric folded to a substantially S-shaped con-

figuration along fold lines extending from the top towards the bottom of the bag to form three overlying thicknesses of fabric



and stitching through the three thicknesses of fabric and the leg.

4,010,785

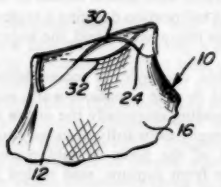
PERSONAL CLOTHING BAG FOR WASHING MACHINE

Robert M. Patik, 823 Reservoir St., Mt. Pleasant, Pa. 15666

Filed Feb. 12, 1976, Ser. No. 657,633

Int. Cl.² B65D *33/24*

U.S. Cl. 150—7 **4 Claims**



1. A personal clothing bag for washing machines, said bag including front and rear mesh panel portions including pairs of registered corresponding marginal edge portions, all of said pairs of corresponding marginal edge portions, except one pair, being secured together, one of said panel portions including an outward extension flap extending along and projecting outwardly of the marginal edge portion thereof comprising one of said one pair of corresponding edge portions, said extension flap being folded back over the outer side of the other marginal edge portion of said one pair of edge portions and including opposite marginal edges overlying, extending along, and sewn to the end portions of second and third pairs of corresponding marginal edge portions of said panel portions between which said one pair of corresponding marginal edge portions extend, the corresponding opposite end portions of said one pair of corresponding marginal edge portions and the overlying portions of said extension flap being sewn together inwardly therealong from said second and third pairs of edge portions to the opposite ends of central portions of said one pair of edge portions and with said central portions of said one pair of edge portions and the corresponding overlying portion of said flap being free of connections with each other.

4,010,786

SEALED CONTAINER

Georges Aguettant, l'avenue Jules Carteret, and Louis Doyen, 79, rue de Bourgogne, both of Lyon, France

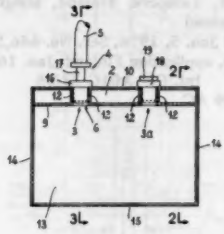
Filed Apr. 8, 1974, Ser. No. 459,190

Claims priority, application France, Apr. 10, 1973, 73.13609

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² B65D *33/36*

U.S. Cl. 150—8 **6 Claims**



1. A container comprising a hollow body of sealable sheet material with two integrally interconnected and coextensive rectangular portions marginally sealed to each other along first, second and third edges and infolded along the fourth edge to form an inwardly projecting gore with a ridge spaced from said second edge opposite said fourth edge, the flanks of said gore being sealed to each other over part of the length of said fourth edge with formation of at least one outwardly open pouch closed by said ridge and separated thereby from the interior of said body, and a rigid sleeve inserted into said pouch in fluidtight peripheral contact with the surrounding sheet material of said gore.

4,010,787

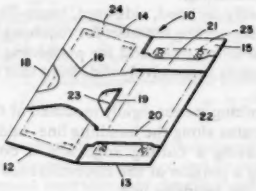
WALLET

Allan Michael Traugott, 37 Linden Ave., Atherton, Calif. 94025, and Lony P. Traugott, 91 Flood Circle, Atherton, Calif. 94025

Filed Nov. 3, 1975, Ser. No. 628,163

Int. Cl.² A45C *1/06*

U.S. Cl. 150—35 **6 Claims**



1. A wallet for carrying currency of various denominations together with a plurality of credit cards, said wallet comprising:

a pair of at least partially resilient foldable rectangular planar members having relatively larger length and smaller width dimensions greater than the dimensions of said currency, each said planar member having inner and outer faces respectively with the inner faces of said members adapted to normally be maintained in near abutment, the members in combination being foldable lengthwise along central fold lines so that the outer face of one of the planar members is concealed in said folded configuration;

a plurality of slit pockets arranged in the outer face of said one of the planar members, the openings of said slit pock-

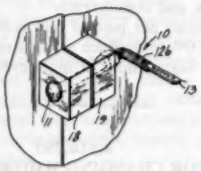
ets being disposed generally parallel to the widthwise dimension of said one rectangular member, said slit pockets being disposed on each side of the fold line with the openings of said slit pockets disposed toward said fold line; and

strap means joining lengthwise lateral edges of the respective planar members disposed oppositely when the inner faces of the planar members are in near abutment so that the currency of high and low denominations respectively can be disposed against the respective inner faces of the members and retained thereagainst by the strap means and a plurality of credit cards can be located in the slit pockets and are concealed when the planar members are maintained in their folded configuration.

4,010,788
BOLT SEAL

James J. Van Gompel, Fremont, Ind., assignor to Brammall, Inc., Angola, Ind.

Filed Sept. 29, 1975, Ser. No. 617,597
Int. Cl.² F16B *39/02*
U.S. Cl. 151—2 A **4 Claims**



1. A bolt seal comprising:

a bolt with a threaded portion having a head at one end and a flattened area at the other end on which an identification can be printed,

a nut threadedly receivable on said threaded portion,

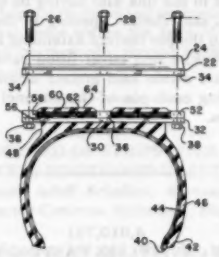
wherein said nut is a spin nut which has a first cup-shaped cylindrical member with sides and a bottom at right angles to the sides and with a central opening through which said bolt is receivable, and a threaded member with a central threaded opening receivable into said cup-shaped member and rotatably attached to said cup-shaped cylindrical member,

wherein said spin nut further includes a cover second cup-shaped cylindrical member with sides and a flat bottom at right angles to the sides and with a central opening through which said bolt is receivable and said cover member non-rotatably attached to said first cup-shaped cylindrical member and said threaded member rotatably confined between said first and second cup-shaped cylindrical members whereby said threaded member rotates when said spin nut is turned in a first direction but does not turn when said spin nut is turned in the other direction and also includes a second flattened area formed on said bolt near its head upon which an identification can be printed and said identification corresponding to the identification on the flattened area at said other end, and wherein said bolt is made of material that has a characteristic such that said threaded portion of said bolt does not break when bent 90° but which breaks when straightened to its initial position.

4,010,789
ANCHOR PLATE TIRE

Aleksandar Vidakovic, and Rodney H. Anderson, both of Libertyville, Ill., assignors to International Harvester Company, Chicago, Ill.

Filed Sept. 2, 1975, Ser. No. 609,471
Int. Cl.² B60C *27/20*; B62D *55/28*
U.S. Cl. 152—182 **10 Claims**



1. A pneumatic tire comprising:

a carcass portion having a partially opened toroidal cross section including bead sections, sidewall sections and a crown portion, said crown portion disposed centrally between said sidewall sections and diametrically opposite said opened portion between said bead sections; and

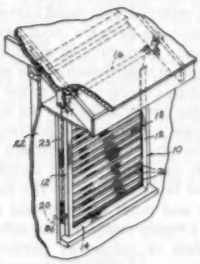
a plurality of radially disposed anchor plates positioned on said flat crown portion; and

an anchor ply circumferentially disposed around said crown portion of said pneumatic tire on top of said anchor plates wherein said pneumatic tire including said carcass portion, said anchor plates and said anchor ply is assembled, formed, and cured into a single unified assembly.

4,010,790
SLATTED WINDOW ASSEMBLY

John Varga, 51724 Hollyhock Road, South Bend, Ind. 46637

Filed Sept. 3, 1976, Ser. No. 720,106
Int. Cl.² E06B *9/08*
U.S. Cl. 160—133 **3 Claims**



1. In a window assembly having a frame and a flexible slatted curtain carried by said frame between spaced guide means, a winding device, one end of said curtain connected to said winding device, means for rotating said winding device to cause said curtain to be wound about and unwound from the winding device in shifting between raised and loweed positions, the improvement wherein said curtain includes a plurality of slats located side by side, each slat including a channel part and a cover, each channel part including a base having end portions and spaced sides projecting from said base, said sides defining opposed groove means extending between said base end portions, a pin carried by said base at each end portion thereof, each pin projecting outwardly from said base and terminating adjacent the level of said opposed groove

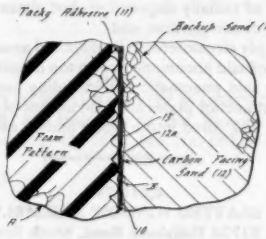
means, a slotted opening formed in each side at each base end portion between said base and the groove means of the side, a plurality of links each having a longitudinal slot formed therein extending from one end portion to the other end portion of the link, a said link located at corresponding base end portions of adjacent channel parts and having one of its end portions fitted through a said slotted opening in one adjacent channel part with the pin thereof extending lockingly through said slot in the link and having its other end portion fitted through a said slotted opening in the other adjacent channel part with the pin thereof extending lockingly through said slot in the link, a said cover fitted between the sides of each channel part within said groove means of the channel part and overlying each pin of the channel part and locked link end portions.

4,010,791

METHOD FOR CAVITYLESS CASTING EMPLOYING A DUAL LAYER PATTERN COATING

Adolf Hetke, Livonia, and Kip M. Bonds, Union Lake, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Aug. 29, 1975, Ser. No. 608,959
Int. Cl.² B22C 9/02
U.S. Cl. 164—34 **7 Claims**



1. In a process for casting metals by utilization of a mold having embedded therein a destructible pattern of foam thermoplastic resinous material, said mold having refractory particles about said pattern to define a mold cavity and in turn to define a casting upon introduction of molten metal to said pattern and consequent destruction of the pattern, the surface of the resulting casting corresponding to the shape of the mold particles defining the cavity as well as the surface of the foam material, said process including the pouring of molten metal into said mold whereby the foam pattern is destroyed and displaced by metal, the improvement comprising:

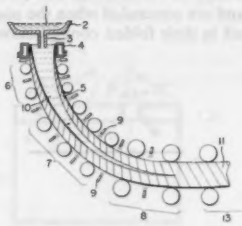
depositing a dual layer coating on the surface of said pattern, the first and inner layer of said coating consisting essentially of a highly tacky viscous adhesive substantially devoid of solids or refractory particles, said adhesive filling the pores or crevices inherently defined in the outer surface of said foam pattern, the second and outer layer of said coating consisting essentially of a collection of dry refractory particles in the size range of 100–140 AFS, each of said particles being secured on said pattern by the adhesive quality of said first layer, only those particles of said second layer having a portion thereof in contact with said first layer being so secured, the particles of said second layer being unsecured with respect to each other and thereby constitute a permeable second layer aligned on the surface of said adhesive to present an ultrasmooth surface, said coating having the first layer thereof volatilized along with said pattern upon pouring of molten metal into said mold while the second layer of said coating remains unaffected and thus functions to define the outer surfae of the resultant casting.

4,010,792

METHOD FOR CONTINUOUSLY CASTING STEEL

Moriyuki Ishiguro; Shinobu Miyahara; Isao Sugawara; Masayuki Hanmyo; Shigetaka Uchida; Hideo Uchibori, all of Fukuyama, and Shigeki Komori, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 30, 1975, Ser. No. 627,065
Claims priority, application Japan, Nov. 25, 1974, 49-134404
Int. Cl.² B22D 11/12
U.S. Cl. 164—76 **1 Claim**



1. In a method for continuously casting steel, comprising:

arranging a group of at least two pairs of reduction rolls near the crater top of a cast strand such that the solidification of the molten steel in said cast strand is substantially completed in said group of reduction rolls,

reducing said cast strand near said crater top by said reduction rolls,

setting the roll pitch of said reduction rolls to about 200mm to 420mm, and concurrently

setting the draft per pair of said reduction rolls to about 0.1% to 2.0% to produce a cast strand with substantially no center segregations or inner cracks.

4,010,793

METHOD FOR CHANGING WIDTH OF CAST SLABS DURING CONTINUOUS CASTING

Yozo Takemura, Tokai; Kouich Hirayama, Cita, and Yoshiyuki Kikuci, Tokai, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

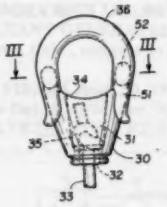
Filed Oct. 29, 1975, Ser. No. 626,639
Claims priority, application Japan, Nov. 8, 1974, 49-128748
Int. Cl.² B22D 11/04
U.S. Cl. 164—82 **3 Claims**

1. A method of changing the width of a steel slab formed in a continuous casting operation in which molten metal is poured into one end of a mold and the slab is withdrawn continuously from the other end of the mold and which mold includes two longer front members and two shorter side members with the front members defining the width surface of the slab being formed and the side surfaces defining the thickness surface of the slab being formed with the side members extending between the front members and defining the opposite ends of the width surface, wherein the improvement comprises moving at least one of the side members relative to the front members at a speed not greater than 2.0 mm/second while continuing to pour the molten metal into the mold and to withdraw the slab from the mold for effecting a significant change in the width of the slab being formed.

4,010,794
METHOD OF CASTING AN ARTICLE HAVING A BODY CAVITY

Ruediger Einhorn, Katonah, N.Y., assignor to Coats & Clark, Inc., Stamford, Conn.

Filed Jan. 22, 1976, Ser. No. 651,617
Int. Cl.² B22D *23/00*; B29C *5/08*; B29D *9/00*; B29F *1/00*
U.S. Cl. 164—94 **10 Claims**



1. A method of forming an article having a body and a fixed loop portion secured to spaced portions of said body and substantially aligned with a cavity extending through said body, said cavity having two ends of different diameters, with the larger of said ends being towards said loop, said method comprising:

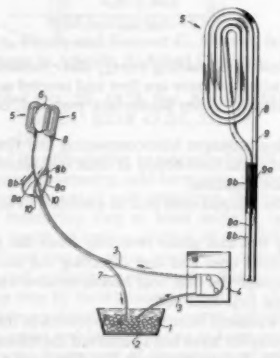
casting said body portion of hardenable material in a first mold cavity and about a core member adapted to define said cavity, said mold cavity being adapted to form said body with two spaced structural portions, each of said portions providing means adapted to interlock with after-molded material to form said loop and hardening of said hardenable material to form said body;

removing said body from said first mold cavity and axially withdrawing said core from the larger end of said cavity having two ends of different diameters; inserting said body in a second mold cavity, casting and hardening further hardenable material under suitable conditions between said spaced structural portions and interlocking with said interlocking members, thereby completing said loop and said article.

4,010,795
COOLING UNIT

Kaj Stenberg, Staffanstorp, Sweden, assignor to Gambro AG, Zug, Switzerland

Continuation of Ser. No. 484,341, June 28, 1974, abandoned. This application Aug. 14, 1975, Ser. No. 604,880
Claims priority, application Sweden, Aug. 2, 1973, 7310636
Int. Cl.² F28F *7/00*; A61F *7/00*
U.S. Cl. 165—46 **1 Claim**

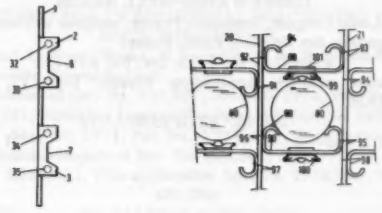


1. In a cooling unit for use in cooling a live body organ, said cooling unit including a source of cooling medium; a cooling body; a first tube means for passage of cooling medium from said source to the cooling body, a second tube means for returning cooling medium from said cooling body to said source, and means for circulating cooling medium through said unit, the improvement wherein said cooling body consists essentially of a formable coil of cooling hose and a permanently deformable stiffening member in the form of a metal wire in said coil, said stiffening member being disposed entirely within the bore of the hose and occupying less than all of the cross-sectional space within the bore of the hose, which cooling body can be manually shaped to firm an enclosure about such body organ.

4,010,796
LATTICE, COMPOSED OF STRIPS WITH CONNECTING BRACKETS POSITIONED IN BETWEEN

Christiaan Gustaaf Adolf Scholtus, Alkmaar, Netherlands, assignor to Reactor Centrum Nederland, The Hague, Netherlands

Continuation of Ser. No. 307,215, Nov. 16, 1972, abandoned. This application Nov. 1, 1974, Ser. No. 520,226
Claims priority, application Netherlands, Nov. 26, 1971, 7116242
Int. Cl.² F28F *7/00*
U.S. Cl. 165—69 **1 Claim**



1. A lattice spacer structure for supporting cylindrical heat exchanging elements, said structure comprising: a plurality of elongated parallel flat strips positioned lengthwise and interconnected with brackets thereby forming a plurality of compartments, each of said compartments being defined by a pair of said strips and a pair of said brackets, each of said brackets including a body portion extending the width between said strips having separate bent lip portions on both sides, each lip portion being fastened to one of said strips by spot welds which are spaced-apart along a line parallel to the axis of the compartment and each lip portion having a notch between every two spot welds and an integral curved spacer, said spacers being positioned on one of said brackets to support said cylindrical heat exchanging elements within one of said compartments, and said cylindrical elements also being secured to a second bracket by a plate spring fastened to the back of each of said brackets.

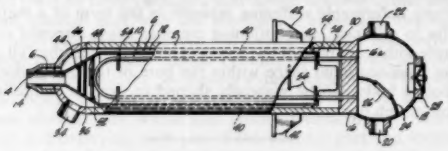
4,010,797
HEAT EXCHANGER

Fiske O. Parnkopf, and George E. Good, both of Arcadia, Calif., assignors to C F Braun & Co, Alhambra, Calif.

Filed Mar. 4, 1974, Ser. No. 447,912
Int. Cl.² F28F *9/22*
U.S. Cl. 165—159 **4 Claims**

1. A heat exchanger comprising an outer shell, a bundle of heat exchange tubes extending longitudinally within said shell, a shroud spaced between said outer shell and said heat exchange tubes to provide an annular passageway therebetween, said shroud sealably attached to said shell at one end within an inlet nozzle so the inlet nozzle is in communication with the heat exchange tubes within said shroud but is sealed from the passage defined by said shell and said shroud, said shell and said inlet nozzle at one end permitting admission of fluid into

the shell substantially longitudinally along the heat exchange tubes and the inner surface of the shroud, an outlet nozzle at substantially the same end of the shell as said inlet nozzle for exit of the heat exchanged fluid after passage between the shell and the outer surface of the shroud, and a tube sheet



connected to said shell at the end opposite from said inlet nozzle, whereby the cooled heat exchanged fluid passes along the face of said tube sheet and along the outer surface of the shroud at a temperature that minimizes the thermal gradient across said tube sheet and to maintain a relatively uniform temperature along the inner surface of said shell.

4,010,798

METHOD AND APPARATUS FOR COMPLETING UNDERWATER WELL HEADS

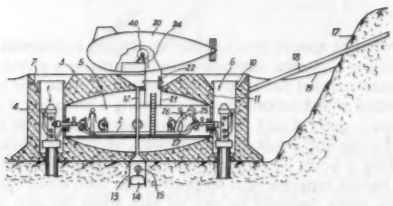
Jean Louis Corgnet, Boulogne, France, assignor to Compagnie Francaise des Petroles, Paris, France

Filed Dec. 10, 1975, Ser. No. 639,491

Claims priority, application France, Dec. 17, 1974, 74.41534

Int. Cl.² E21B *43/01, 7/12*

U.S. Cl. 166—.5 **21 Claims**



1. A method of completion of at least one undersea oil well comprising the steps of:

installing a well head in a compartment laterally adjacent to and integral with an enclosure which is in fluid communication with said compartment by way of a separator plate,

sealing the enclosure from said compartment by closing said hatch,

filling said enclosure with air at atmospheric pressure,

lowering said structure vertically within the sea and onto the sea bed where the oil gathering is to be carried out, to allow drilling to occur by access through the open compartment to the well head carried thereby,

placing a production head within said compartment,

rendering the compartment watertight,

removing the water from the compartment from inside the integral enclosure,

filling the compartment with a mixture of gases at the pressure of the enclosure,

opening said plate between said enclosure and said laterally adjacent compartment,

connecting the production head within said compartment to the manifold within said enclosure by a connector plate which seals the compartment from the enclosure in a watertight manner after connection, and

opening the compartment to the sea.

4,010,799

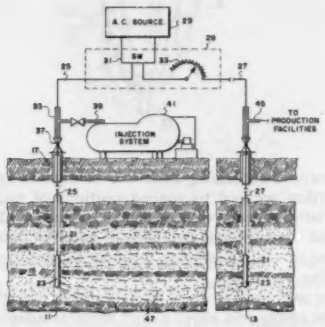
METHOD FOR REDUCING POWER LOSS ASSOCIATED WITH ELECTRICAL HEATING OF A SUBTERRANEAN FORMATION

Loyd R. Kern, Irving, and Thomas K. Perkins, Dallas, both of Tex., assignors to Petro-Canada Exploration Inc., Calgary; Imperial Oil Limited, Toronto and Canada-Cities Service, Ltd., Calgary, all of, Canada

Filed Sept. 15, 1975, Ser. No. 540,434

Int. Cl.² E21B *43/24*

U.S. Cl. 166—248 **1 Claim**



1. Method of reducing power losses associated with transmission of electrical energy down a wellbore to heat a subterranean formation via electrical conduction between a plurality of wells completed therein, which comprises, passing an alternating current having a frequency of from about 0.10 to about 5.0 cycles per second through the conductors in said wellbore.

4,010,800

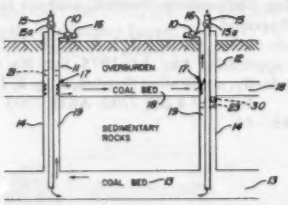
PRODUCING THIN SEAMS OF COAL IN SITU

Ruel C. Terry, Denver, Colo., assignor to In Situ Technology, Inc., Denver, Colo.

Filed Mar. 8, 1976, Ser. No. 664,570

Int. Cl.² E21B *43/24*

U.S. Cl. 166—258 **5 Claims**



4. A method of extracting energy and chemical values from coal in situ wherein there are first and second subsurface coal beds separated by other subsurface material, comprising the steps of,

establishing passages interconnecting the first and second coal beds and connecting at least said second coal bed to a surface location,

igniting the second coal bed to establish in situ gasification thereof,

capturing hot exit gases resulting from the gasification of the second coal bed and directing the hot exit gases to and through the first coal bed to remove volatile material from the first coal bed,

injecting a sealant material into portions of the first coal bed after volatiles have been removed therefrom whereby the hot gases flowing through the first coal bed will follow alternate paths through the first coal bed,

capturing the hot gases and entrained volatiles emanating from the first coal bed, and

transferring the hot gases and entrained volatiles to the surface.

4,010,801

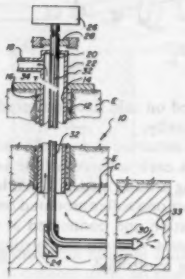
METHOD OF AND APPARATUS FOR IN SITU GASIFICATION OF COAL AND THE CAPTURE OF RESULTANT GENERATED HEAT

Ruel C. Terry, Denver, Colo., assignor to R. C. Terry, Denver, Colo.

Division of Ser. No. 510,409, Sept. 30, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 619,562

Int. Cl.² E21C *43/00*; E21B *43/24*

U.S. Cl. 166—261 **4 Claims**



1. A process for in situ gasification of coal comprising the steps of:

establishing a passage of fluid communication between a surface location and a sub-surface coal formation,

inserting a flexible conduit into the passage so that it opens into the coal formation,

establishing an hermetic seal between the coal formation and the above surface ambient environment,

igniting the coal formation,

injecting gasifying agents through the conduit to sustain the burning of the coal formation,

releasing the gasifying agents at the receding burning face of the coal formation by increasing the extent to which the conduit extends into the formation so that the conduit opens at the burning face, and

capturing the gaeous products emitted from the burning coal.

4,010,802

WELL STIMULATION

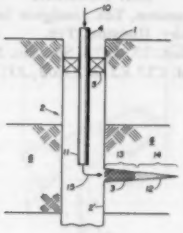
Leon H. Miles, Plano, and Ferman G. Martin, Irving, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Oct. 28, 1975, Ser. No. 626,245

Int. Cl.² E21B *43/26*, *33/138*

U.S. Cl. 166—281 **9 Claims**

1. A method for stimulating an unconsolidated formation in a well comprising fracturing said formation without any prior consolidation treatment of said formation, the fracturing fluid used in said fracturing step at least initially containing no consolidating agent, at least a portion of said fracturing fluid containing at least one propping agent, and consolidating only a portion of said propping agent in the fractures created by said fracturing step by maintaining the portion of said fracturing fluid which contains propping agent initially devoid of consolidating agent and incorporating at least one consolidating agent into the latter part of the portion of said fracturing fluid which contains propping agent, said consolidating agent being incorporated in a sufficient portion of said latter part of fracturing fluid essentially to consolidate said propping agent



in the fractures near said wellbore, whereby said unconsolidated formation remains essentially unconsolidated.

4,010,803

METHOD FOR CRYOTHERMAL FRACTURING OF ROCK FORMATIONS

Sigmund L. Ross, Bronx, N.Y., assignor to Rose Shuffman, executrix, Scarsdale, N.Y.

Division of Ser. No. 523,887, Nov. 14, 1974, Pat. No. 3,978,921, which is a continuation-in-part of Ser. No. 148,048, May 28, 1971, Pat. No. 3,759,329, which is a continuation-in-part of Ser. No. 823,306, May 9, 1969, Pat. No. 3,581,821. This application Apr. 29, 1976, Ser. No. 681,764

Int. Cl.² E21B *43/24*, *43/26*

U.S. Cl. 166—303 **7 Claims**

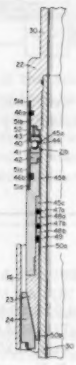
2. A method of fracturing a rock formation surrounding a downwardly extending hole which comprises lowering into said hole a plugging device to a position spaced substantially from the bottom of the hole, causing said plugging device to expand until it becomes fixed in place and is effective to retain free water in said hole above said plugging device, introducing water into said hole until a body of free water is retained in said hole above said plugging device, and flash freezing said body of free water by bringing a cryogenic liquid into intimate contact therewith.

4,010,804

DISTRIBUTED LOAD LINER HANGER AND METHOD OF USE THEREOF

Juan A. Garcia, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Mar. 27, 1975, Ser. No. 562,691
Int. Cl.² E21B *23/02, 33/14*
U.S. Cl. 166—315 **26 Claims**



1. A method of suspending a lower well pipe from an upper well pipe in a well bore comprising:

a. lowering a hanger assembly having said lower well pipe suspended therefrom into said upper well pipe, said hanger assembly including at least two hanger means;

b. securing one of said hanger means to said upper well pipe;

c. setting a predetermined share of the weight of said suspended lower well pipe on said secured hanger means and thereafter securing each of the remaining hanger means to said upper well pipe one at a time and resting a predetermined amount of the weight of said suspended lower well pipe on each of said remaining hanger means prior to securing each subsequent hanger means until all of said hanger means are secured and the weight of said suspended lower well pipe is distributed in a predetermined ratio over all of said hanger means.

24. Apparatus for suspending a lower well pipe from an upper well pipe arranged in a well bore comprising a hanger unit connected to said upper well pipe, said hanger unit having bearing means, said bearing means being sealed from well fluids and pressure balanced to equalize internal and ambient external pressures; and

said lower well pipe extending through and supported on said hanger unit to permit rotation of said lower well pipe relative to said upper well pipe.

4,010,805

FLOW THROUGH BRUSH CUTTER

Leon O. Kelley, 916 Texas St., Stamford, Tex. 79553

Filed Apr. 29, 1974, Ser. No. 464,969
Int. Cl.² A01B *13/00, 35/20*
U.S. Cl. 172—698 **11 Claims**

1. A flow-through brush cutter for attachment to a vehicle comprising:

a generally thin, flat blade adapted for movement along a generally horizontal plane extending beneath the surface of the earth;

a pair of legs secured to and extending upwardly from spaced points on the blade, each of said legs having a substantially thin cross-section in the direction extending transversely to the direction of movement of the blade;

a pair of arms detachably secured to the upper ends of the legs and extending forwardly therefrom;

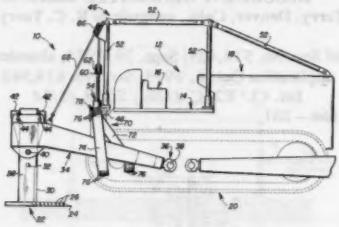
means pivotally connecting the forward ends of the arms to the vehicle;

fluid-powered cylinder means;

a subframe mounted on the vehicle;

means mounting said fluid-powered cylinder means on said subframe;

rollers mounted on said subframe at elevated positions;



a beam mounted on said fluid-powered cylinder means for actuation thereby;

a pair of rollers mounted at spaced points on said beam; and

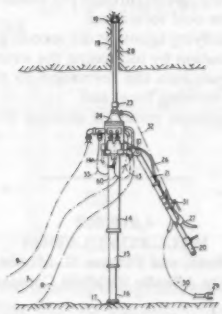
a pair of cables each secured at one end to said subframe and extending around one of the rollers of said beam and around at least one roller mounted on said subframe at an elevated location and connected at the opposite end to one of the arms wherein the vertical positioning of the blade may be controlled.

4,010,806

ROCK BOLTING EQUIPMENT

Kenneth Joseph Broadbent, Speers Point, Australia, assignor to The Titan Manufacturing Company Proprietary Limited, Newcastle, Australia

Filed Nov. 16, 1972, Ser. No. 307,228
Int. Cl.² E21C *1/10*
U.S. Cl. 173—57 **7 Claims**



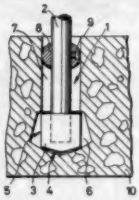
1. Drilling equipment for drilling holes in mine roofs for the purpose of rock bolting comprising, an intermediate portion having mounted on and extending from it at one end a telescopic leg, a drill rod mounted on and extending from said intermediate portion at the other end thereof, a hydraulic motor mounted on the intermediate portion and coupled to said drill rod, first valve means adapted to be connected to a pressure fluid source for supplying pressure fluid to said leg for extending it or for releasing fluid from said leg, second valve means adapted to be connected to a pressure source for supplying pressure fluid to said hydraulic motor for driving it or for shutting-off the supply of pressure fluid to the motor for stopping it, an elongated torque and control arm pivotally

connected at one end to the intermediate portion and having at its outer end means for controlling said first and second valve means independently of each other, whereby an operator is permitted to resist the torque produced by the drill when in operation and allowing the operator to control the drill from a distance.

4,010,807
TOOL FOR FORMING A HOLE FOR A FASTENING ELEMENT

Athur Fischer, Altheimer Strasse 219, D-7241 Tumlingen, Germany

Filed Oct. 2, 1974, Ser. No. 511,256
Claims priority, application Germany, Oct. 5, 1973, 2349998
Int. Cl.² E21B *17/10*; E21C *9/00*
U.S. Cl. 175—325 **6 Claims**



1. A tool for drilling undercut holes in a stationary support structure comprising, in combination, an elongated drill shaft having an axis of rotation; a drill bit at one end of said drill shaft and having cutting edges located radially outwardly of said drill shaft, said cutting edges being operative for removing material from the stationary support structure to initially form a cylindrical hole therein; and means axially adjustably fixed to said drill shaft for supporting said drill shaft and pivoting the latter out of axial coincidence with the cylindrical hole about a fulcrum located adjacent an inlet end of the hole whereby said cutting edges remove material from the support structure beyond the confines of the cylindrical hole in a region thereof remote from the inlet end to thereby increase the cross-sectional area of the hole in such region at a selected distance from said fulcrum.

4,010,808
EXPANDABLE RAISE BIT

Thomas Franklin Youngblood, Desoto, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Sept. 22, 1975, Ser. No. 615,736
Int. Cl.² E21B *9/24*
U.S. Cl. 175—334 **2 Claims**

1. A raise bit for enlarging a first hole into a larger second hole by being drawn through said first hole and disintegrating earth formations surrounding said first hole, comprising:

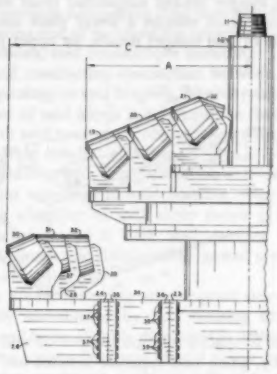
a drive stem;

a raise bit body connected to said drive stem, said drive stem defining a bit axis of rotation;

primary cutter means positioned on said bit body for disintegrating the formations out to a first radial distance from said bit axis of rotation;

secondary cutter means adapted to be connected to said bit body selectively located in a first position for disintegrating the formations between said first radial distance and a second radial distance from said bit axis of rotation, said second radial distance being greater than said first radial distance, and selectively located in subsequent positions for disintegrating the formations between said first radial distance and subsequent radial distances from said bit axis of rotation, said subsequent radial distances being greater than said second radial distance; and

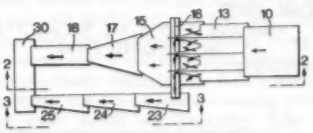
expansion means adapted to be located between said secondary cutter means and said bit body for locating said secondary cutter means in said subsequent positions.



4,010,809
WEIGHING METHOD

Jack Hobart, Leamington Spa, England, assignor to Hobart Engineering Limited, England

Continuation of Ser. No. 489,833, July 17, 1974, Pat. No. 3,938,601. This application Nov. 25, 1975, Ser. No. 635,105
Claims priority, application United Kingdom, July 17, 1973, 34038/73
Int. Cl.² G01G *13/02*
U.S. Cl. 177—1 **3 Claims**



1. A method of weighing a product made up of irregular pieces into a batch of predetermined weight, including grading a flow of the irregular pieces to separate a supply of smaller-sized pieces from the flow which will be more than adequate for making successive batches up to the predetermined weight, conveying the remaining flow of pieces towards a weighing device, delivering pieces from the remaining flow to the weighing device until a batch of the product is accumulated having a weight slightly less than said predetermined weight, separately conveying smaller-sized pieces from said supply towards the weighing device, adding the separately conveyed smaller-sized pieces to the batch until the said predetermined weight is just achieved, and allowing any excess accumulation of said smaller-sized pieces graded from the flow to be deposited in the remaining flow before it reaches the weighing device.

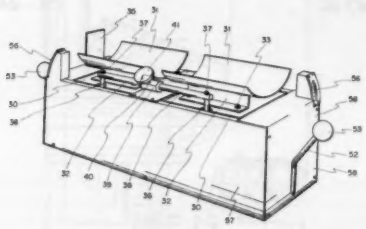
4,010,810
HEAVY DUTY DENIER TYPE BALANCE

Victor W. Pickett, 205 Wilson Ave., Kinston, N.C. 28501

Filed Mar. 19, 1975, Ser. No. 559,723
Int. Cl.² G01G *23/02*, *1/24*, *19/00*, *21/22*
U.S. Cl. 177—157 **12 Claims**

1. A balance for comparative weighing of denier tubes and other articles comprising: a base; a main support fixedly secured to said base; a pivot means in operative contact with

said support means; at least one elongated rocker arm fixedly secured at its central portion to said pivot means; second and third pivot means fixedly secured one at each end of said rocker arm; a hanger means suspended from each of said second and third pivot means; a lower plate means fixedly secured to each of said hanger means; an upper plate means



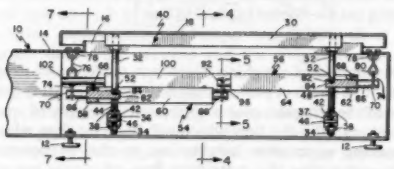
fixedly secured in spaced relation to each of said lower plate means whereby, when two separate articles are placed one each on said upper plates, the weight differential, if any, between said articles can be determined; and a toggle actuated locking bar means disposed between said base and said lower plate means for preventing relative movement therebetween when so desired.

4,010,811

PLATFORM SCALE

Vincent Joseph Muccillo, Jr., 952 La Jolla Rancho Road, La Jolla, Calif. 92037

Filed Aug. 7, 1975, Ser. No. 602,771
Int. Cl.² G01G *21/08*
U.S. Cl. 177—257 **11 Claims**



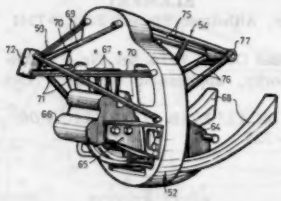
1. A platform scale, comprising:
a housing,
a weighing platform mounted above said housing,
a suspension frame attached to said platform and extending downwardly into the housing,
lever means pivotally suspended in said housing and having an output arm for attachment to weight readout means,
said suspension frame being pivotally attached to said lever means,
certain of the pivotal attachments between said lever means and said suspension frame each including a hanger pin longitudinally secured in the lever means and having a V-notch therein,
a link plate pivotally attached to the suspension frame and having a blade portion engaged in the V-notch fixing the longitudinal position of the blade portion along the length of the hanger pin,
and means for selectively adjusting the longitudinal fixed position of the hanger pin thereby selectively moving the position of the link.

4,010,812

MOTORCYCLE FRAME

Peter William Bothwell, 114 Shipston Road, Stratford-upon-Avon, Warwickshire, England

Continuation-in-part of Ser. No. 406,914, Oct. 16, 1973, abandoned. This application May 21, 1975, Ser. No. 579,669
Claims priority, application United Kingdom, May 22, 1974, 22857/74
Int. Cl.² B62K *11/04*
U.S. Cl. 180—33 A **14 Claims**



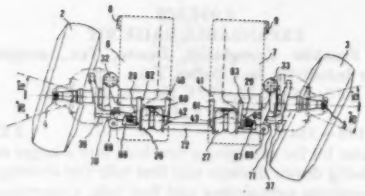
1. A motor cycle frame comprising a fundamental rigid member of unitary form which extends transversely of the frame and constitutes the widest and deepest part thereof, the member being relatively narrow in the longitudinal direction of the frame and comprising mounting means for an engine and a gear box; a front cantilever structure which is secured to the member so as to be supported thereby and to project solely forwardly therefrom; and a rear cantilever structure which is secured to the member so as to be supported thereby and to project solely rearwardly therefrom, the front and rear structures being independent of one another.

4,010,813

LEADING LINK TYPE INDEPENDENT SYSTEMS

André Quignlot, 161, rue de Larmor, 56100 Lorient (Morbihan), France

Filed Mar. 10, 1976, Ser. No. 665,391
Int. Cl.² B62D *7/00*
U.S. Cl. 180—73 C **6 Claims**

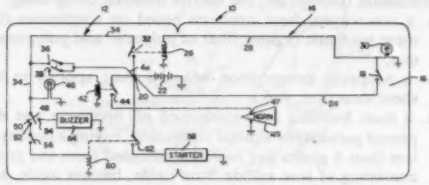


1. An independent suspension system of the leading link type for a vehicle, in which a pair of independent leading links are mounted on vehicle frame for oscillating movement, comprising a half axle fixed to each leading link, a stub axle pivotally connected to each half axle by a vertical swivel pin, an assembly mounted between each leading link and its associated half axle including an elastic chamber disposed in parallel with an anti-roll damper, a vertical axis pivot mounting effectively connecting said elastic chamber to its leading link, one of the ends of said anti-roll damper being connected to said vertical axis pivot mounting, and a ball-jointed connecting bar interconnecting both said vertical axis pivot mountings.

4,010,814
INTERLOCK SYSTEM FOR EMERGENCY VEHICLES

Thomas C. Adams, 7190 W. 2nd Lane, Hialeah, Fla. 33014

Filed Oct. 16, 1975, Ser. No. 623,042
Int. Cl.² B60K *26/02*
U.S. Cl. 180—82 R 4 Claims

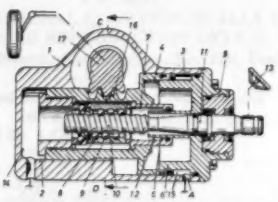


1. An interlock system for an emergency vehicle for preventing the vehicle engine from being started unless a crew member is manning a post at a predetermined location remote from the driver of the vehicle, said system comprising: an electrical starter for said engine; a first switch means at said post for actuation by said crew member; a first indicator lamp at said post for view by said crew member; a second indicator lamp positioned for being viewed by said driver; a second switch means for actuation by said driver for controlling electrical energization of said starter; and means responsive to actuation of said first switch means for electrically energizing said second switch means for enabling said second switch means to control energization of said starter and for electrically energizing said first and second indicator lamps.

4,010,815
SERVO STEERING GEAR, PARTICULARLY FOR ALLEVIATOR-CONTROLLED CONSTANT PRESSURE SERVO SYSTEMS IN MOTOR VEHICLES

Günther Strauff, Kaarst, Germany, assignor to Langen & Co., Dusseldorf, Germany

Filed May 29, 1975, Ser. No. 581,929
Claims priority, application Germany, June 1, 1974, 2426712
Int. Cl.² B62D *5/08*
U.S. Cl. 180—132 7 Claims



1. In a constant pressure blocked-center servo system for motor vehicles, including an input member connected to a steering wheel and an output member connected to steered wheels of a vehicle, a working fluid operated servo motor having first and second working chambers connected to said output member, control means in fluid communication with said motor for controlling the pressure of said work fluid to said servo motor including a housing substantially surrounding said control means, a source of pressurized working fluid in fluid communication with a first opening in said housing for supplying pressurized working fluid to said control means,

an exhaust fluid conduit means in fluid communication with a second opening in said housing for receiving an exhaust fluid from said control means, and

fluid conduit means connecting said first working chamber of said motor in fluid communication with a third opening in said housing for transmitting working fluid to and receiving exhaust fluid from said first working chamber of said motor, said third opening normally not in fluid communication with said first and second openings,

the improvement comprising fluid flow switching means for completing one of two possible separate fluid conducting connections, said connections including:

a first fluid conducting connection between said first and third openings in said housing, whereby said first working chamber of said motor is connected in fluid communication with said source of pressurized working fluid by way of said fluid conduit means, and

a second fluid conducting connection between said second and third openings in said housing, whereby said first working chamber of said servo motor is connected in fluid communication with said exhaust fluid conduit means through said fluid conduit means, said fluid switching means including:

first valve means including an elongated sleeve means substantially surrounded by said housing of said control means and being slidably displaceable within said housing along the longitudinal axis of said sleeve means between first and second limit positions defined by said housing,

said first valve sleeve means comprising first and second ends adjacent said first and second limit positions, respectively, and first, second, and third fluid conducting cavities in constant fluid communication with said first, second, and third openings in said housing, respectively; and

second valve means substantially enclosed within said first valve means, including an elongated valve shaft slidably displaceable within a first bore extending along the longitudinal axis of said first valve sleeve means, said elongated valve shaft including:

first and second shaft sections fluid sealingly engaging the surface of said first bore, and

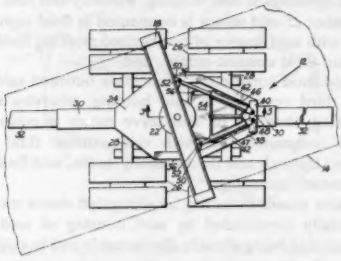
a third shaft section disposed between and of smaller diameter than said first and second shaft sections, said first shaft section with said first and second shaft sections and said surface of said first bore defining an annular, fluid conducting passageway being in fluid communication with said third fluid conducting cavity and longitudinally shiftable into fluid communication with said first and second fluid conducting cavities, said second valve means also including: fluid pressure change responsive means for longitudinally shifting said elongated valve shaft means and said passageway into communication with one of said first and second fluid conducting cavities, said fluid pressure responsive means including a fluid pressure reaction chamber in fluid communication with said first working chamber of said servo motor and piston means connected to a first end portion of said valve shaft, said piston means longitudinally shiftable between limit positions in said reaction chamber, whereby fluid pressure changes inside said reaction chamber acting on said piston means serve to longitudinally shift said valve shaft and to place said passageway into fluid communication with one of said first and second fluid conducting cavities,

said control means further including actuating means responsive to said input member for causing fluid pressure changes in said reaction chamber, whereby turning of said steering wheel acts upon said input member causing said actuating means to longitudinally displace said first valve sleeve means and to move said first or second fluid conducting cavity into fluid communication with said passageway thereby causing an increase or decrease in fluid pressure in said reaction chamber, said increase or decrease acting on said piston means causing said valve shaft to shift longitudinally to increase or decrease fluid pressure in said first working chamber and thereby to supply motive power to said output member.

4,010,816
STEERABLE TRAILER

Charles R. Powell, 6729 N. Richmond Ave., Portland, Oreg. 97203

Filed Feb. 4, 1976, Ser. No. 655,107
Int. Cl.² B60P 3/40; B62D 5/08
U.S. Cl. 180—144 7 Claims

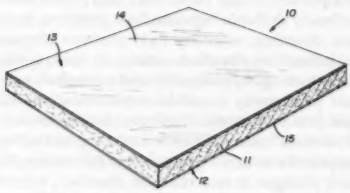


1. A steerable trailer for hauling elongated loads wherein the load comprises the pulling connection between a pulling tractor and the trailer, comprising
   a. a wheel supported frame,
   b. a bunk pivotally supported on said frame for supporting the rear of the long load and forming the pulling connection for the trailer with the load,
   c. a pair of extendable drive means connected between said bunk and said frame and arranged to pivot said frame relative to said bunk for steering the trailer,
   d. electrical power operated means on said trailer operating said drive means,
   e. and electric circuit control means for said electrical power operated means for selectively controlling the latter.

4,010,817
PAPER-BACKED ACOUSTICAL TILE

Herbert L. Warren, Arlington Heights, and Bruce A. Wittrup, Hoffman Estates, both of Ill., assignors to United States Gypsum Company, Chicago, Ill.

Filed May 20, 1974, Ser. No. 471,392
Int. Cl.² E04B 1/99
U.S. Cl. 181—33 G 8 Claims



1. An acoustical tile comprising a relatively thin, flat body of mineral wool and a binder and having a back surface and a face surface and constituting the major proportion of said tile, and a paper sheet-form member uniformly affixed to and substantially coextensive with the entire back surface of said body, said paper sheet-form member being water absorbent, having good sound attenuation properties, and having a non-water-leachable fire-retardant material associated therewith, and a protective coating over said face surface and directly on said mineral wool.

4,010,818
FLEXIBLE NOISE BARRIER MATERIAL

Melvin W. Westley, Trumbull, Conn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

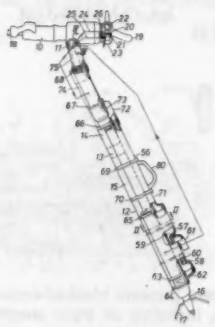
Filed June 10, 1975, Ser. No. 585,589
Int. Cl.² F04B 1/99; G10K 11/04; B32B 19/02
U.S. Cl. 181—33 G 8 Claims

1. A flexible barrier material capable of reducing sound transmission through air; the barrier material comprising:
   a. a non-woven sheet structure based on continuous filament synthetic organic fiber of polyester and polypropylene,
   b. a neoprene composition adhesive coat applied to the sheet structure, and
   c. a mass building coat comprised of, neoprene and dispersed particles of a metal compound, having a density of less than 6 grams per milliliter, selected from the group consisting of iron sulfide, iron oxide, barium oxide, and barium sulfate; wherein the mass building coat is applied upon the adhesive coated sheet structure.

4,010,819
ARRANGEMENT FOR MUFFLING THE EXHAUST OF A PNEUMATIC ROCK DRILLING MACHINE

Gösta Ivar Ekstrom, Nacka, and Karl-Evert Johansson, Ektorp, both of Sweden, assignors to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Dec. 2, 1974, Ser. No. 528,908
Claims priority, application Sweden, Dec. 27, 1973, 73174393
Int. Cl.² F01N 3/06
U.S. Cl. 181—36 A 18 Claims

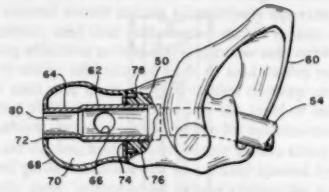


1. In a pusher leg arrangement for rock drills, the combination of a pneumatic rock drill (10) and a pressure fluid operated pusher leg (12) for the supporting and feeding of said rock drill, means (11) for providing a hinge connection between said pusher leg and said rock drill, a muffler housing (56) associated with said pusher leg, an exhaust port (55) in said rock drill through which air under pressure is discharged during operation of said rock drill, and means for fluid tight connecting said muffler housing to said exhaust port, said fluid tight connecting means including an inlet mouth, said inlet mouth being arranged substantially in alignment with said hinge connection but spaced axially therefrom.

4,010,820
ACOUSTIC EAR MOLD FOR HEARING AID

Rubein V. Johnson, 2432 Court St., Muskogee, Okla. 74401

Division of Ser. No. 408,943, Oct. 23, 1973, Pat. No. 3,921,756. This application Aug. 1, 1975, Ser. No. 601,167
Int. Cl.² A61B 7/02
U.S. Cl. 181—135 6 Claims

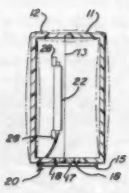


1. In a hearing aid ear mold insertable into the ear canal and having a longitudinal conduit for the passage of sound wave energy from a hearing aid to the tympanic membrane of the ear, the improvement comprising a metal structure having:
   a. a central thin walled metal tube forming said conduit, connected at one end by tubular means to said hearing aid, the other end inserted into the ear;
   b. an outer thin walled metal tube coaxial with said central tube, and forming an annular space, closed by annular end walls, sealing the space between the ends of said two tubes;
   c. an opening in the wall of said central tube, joining said annular space and the space inside said conduit;
   d. and wherein said outer tube is of a diameter and shape to snugly fit the ear canal whereby vibration of said outer tube is communicated directly to the auditory meatus and to the bony structure of the ear.

4,010,821
OMNIDIRECTIONAL SYMPATHETICALLY DRIVEN SOUND REPRODUCTION DEVICE

Leo-Heinz Quillmann, 4545 Laguna, No. 220, Boulder, Colo. 80303

Filed May 2, 1975, Ser. No. 574,166
Int. Cl.² H04R 1/02, 1/32
U.S. Cl. 181—148 7 Claims

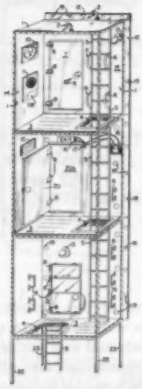


1. A sound reproduction device comprising substantially closed enclosure formed of pliable walls of expanded polymeric material having vent holes defined therein and a speaker system means suspended within and fully surrounded by the enclosure with the enclosure shielding the speaker system means from the atmosphere, thereby acoustically driving the pliable enclosure walls which in turn radiate sound in an omnidirectional manner to the atmosphere.

4,010,822
BUILDING EMERGENCY EXIT MEANS

Philip M. Banner, 28 Oxford Road, Massapequa, N.Y. 11758

Filed Feb. 20, 1974, Ser. No. 444,148
Int. Cl.² A62B 1/20
U.S. Cl. 182—18 11 Claims



1. A building emergency exit means in combination with a building structure having exit means comprising a plurality of modules in stacked relation, and connected to each other, each module comprising a bottom member and top member and having walls to form an enclosure, each module having attachment and locking means for connection to said building and to each other, opening means in said top member and bottom member matching similar openings in adjacent modules, ladder means connected between said top member and bottom member and adjacent said opening means facilitating communications between said modules, opening means in one side of said module and adjacent said exit means in said building for providing access to said modules, each module having alarm means, light means, ventilation means, and electronic communication means.

4,010,823
METHODS AND APPARATUS FOR INSPECTING AND/OR WORKING INSIDE OF A LARGE DRUM

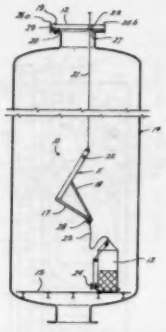
George H. J. Love, Huntington Beach, Calif., assignor to Texaco Inc., New York, N.Y.

Filed Nov. 21, 1975, Ser. No. 634,097
Int. Cl.² E04G 1/36
U.S. Cl. 182—128 9 Claims

1. A method for inspecting and/or working on the internal wall surface of a large drum having a flange on the top rim thereof comprising the steps of,
   a. assembling a right angled spider hanging bracket having a vertical support column and a horizontal lift bracket yoke,
   b. attaching a first hoist cable to the vertical support column,
   c. attaching an end of a cable from a second hoist on an inspector's/worker's cage to a protruding end of the horizontal lift bracket yoke,
   d. securing a crosshead support across the top of the drum rim flange,
   e. lifting the right angled spider hanging bracket with the first hoist to a position immediately under the drum rim flange with the vertical support column adjacent to the crosshead support and the horizontal lift bracket yoke protruding end extending to a position adjacent the wall surface,

f. rigidly attaching the vertical support column to the crosshead support whereby the protruding end of the horizontal lift bracket yoke is adjacent to the drum wall surface, and

g. hoisting the inspector's/worker's cage up and down from



the protruding end of the horizontal lift bracket yoke adjacent the drum wall surface to cover one sector at a time of the drum internal wall surface for providing a fast, thorough, safe, economical, and efficient method of inspecting and/or working on the internal wall surface of a large drum.

4,010,824

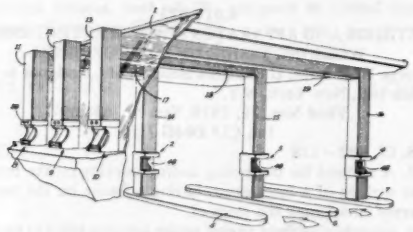
CONVEYOR SYSTEM FOR DRIVE-IN BANKS AND THE LIKE

Edward F. Bavis, c/o The E. F. Bavis & Associates, Inc., 200 Jimson Road, Cincinnati, Ohio 45215

Filed Dec. 24, 1975, Ser. No. 644,112

Int. Cl.² E04H *3/04*

U.S. Cl. 186—1 C **20 Claims**



1. In an integrated conveyor system for conveying a container between a spaced apart pair of stations, a first container receiving means at one of said stations, a first vertical module extending upwardly from said first container receiving means, a second container receiving means at the other of said stations, a second vertical module extending upwardly from said second container receiving means, and a horizontal module extending between the upper ends of said first and second vertical modules, reversible containers conveying means contained in each of said modules, means for concurrently driving each of said container conveying means in the same direction, and translation means at the opposite ends of said horizontal module for transferring the container between the vertical and horizontal modules.

4,010,825

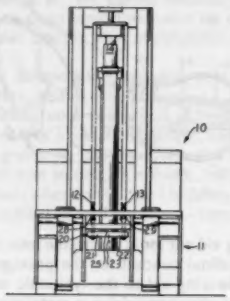
LIFT CHAIN EQUALIZING DEVICE

Charles R. Chelin, Dallas, Oreg., assignor to Towmotor Corporation, Mentor, Ohio

Filed Apr. 5, 1976, Ser. No. 674,028

Int. Cl.² B66B *9/20*; B66F *9/06*

U.S. Cl. 187—9 R **7 Claims**



1. In a material handling apparatus having a generally vertically movable carriage, first and second spaced apart chain assemblies each connected at their first ends to the carriage, and power means associated with the chain assemblies for generally vertically moving the first ends of the chain assemblies and the carriage in response thereto, the improvement comprising:

a pivot element having first and second end portions and a middle portion and being connected at the first and second end portions to the first ends of respective chain assemblies;

a fulcrum member having first and second spaced apart pivot areas positioned at locations substantially equally spaced from the first ends of the chain assemblies with said fulcrum member being at a higher elevation than said pivot element; and

stop means for limiting vertical and pivotal movements of the pivot element to preselected values.

4,010,826

CARGO LOADING VEHICLES

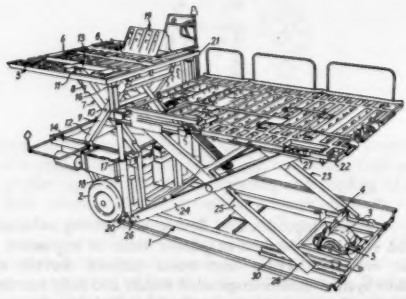
Rodney Vernon Jones, Rochford, England, assignor to Atel Products Limited, Southend-on-Sea, England

Filed Mar. 20, 1975, Ser. No. 560,195

Claims priority, application United Kingdom, Mar. 22, 1974, 12931/74

Int. Cl.² B66B *11/04*

U.S. Cl. 187—26 **9 Claims**



1. A cargo loading vehicle comprising a forward lifting platform, a main lifting platform, said forward lifting platform being movable between a lowered position and a raised posi-

tion by first lifting means, said main lifting platform being movable between a lowered position and a raised position by second lifting means, said second lifting means comprising two spaced apart cables, each of said spaced apart cables having one end attached to said forward lifting platform, each of said spaced apart cables also having a second end operatively connected to said main lifting platform, hoisting means associated with each of said cables, said hoisting means comprising first and second motor means respectively operatively acting on said cables, said first and second motor means when activated being effective to respectively cause said cables to move in order to make said second ends of said cables more nearly approach said one ends of said cables thereby causing said main lifting platform to be raised to the level of said forward lifting platform, synchronizing means for synchronizing movement of said cables, said synchronizing means comprising first and second pulley means over which said spaced apart cables respectively pass, torque tube means connected to said first and second pulley means and fixedly secured thereto as to fixedly rotate with said first and second pulley means, said torque tube means being effective to transmit power as needed from said first pulley means to said second pulley means and from said second pulley means to said first pulley means, and first and second spaced apart lift stabilizing chain means each of which is operatively connected to both said forward lifting platform and said main lifting platform.

4,010,827

CLUTCH ENGAGED BRAKE MECHANISM

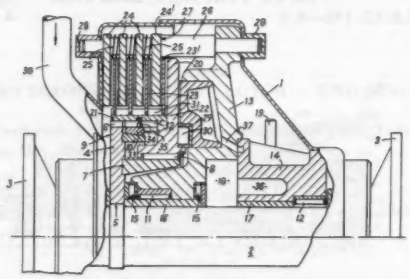
Christopher R. Ellis, Chinley; Richard H. Gibbon, Chapel-en-le-Frith, and Walter R. Stirling, Buxton, all of England, assignors to Ferodo Limited, Manchester, England

Filed Sept. 4, 1975, Ser. No. 610,268

Claims priority, application United Kingdom, Oct. 1, 1974, 42515/74

Int. Cl.² F16D 67/02

U.S. Cl. 188—71.2 **9 Claims**



1. A friction brake characterised by the combination of

a. a casing housing a rotary shaft connectible to or forming part of the propeller shaft or an axle of a vehicle;

b. a retarding device comprising (i) friction plates arranged and adapted to rotate with the rotary shaft and to be axially slidable relative thereto and (ii) stator plates interleaved with the friction plates and mounted within the casing to be axially slidable relative to the rotary member;

c. a hydraulically operable pressure device arranged and adapted to bring the stator plates and friction plates into functional engagement on actuation of the retarding device;

d. a clutch device arranged and adapted in operation to positively connect the friction plates and rotary shaft during periods of actuation of the retarding device whereby the friction plates will rotate with the shaft, and to disconnect the friction plates and rotary shaft during periods of nonactuation of the retarding device said clutch device including an inner hub directly secured to and rotatable with said rotary shaft, and an outer hub axially movable into engagement with said inner hub under the influence of said pressure device on actuation of said retarding device, the outer hub carrying said friction plates, said inner and outer hubs having cooperable positive engagement means and a synchromesh device between said inner and outer hubs;

e. a pump arranged and adapted to circulate hydraulic liquid through the casing and to supply the liquid under pressure to the pressure device on actuation of the brake; and

f. control means arranged and adapted to actuate the pressure device at will.

4,010,828

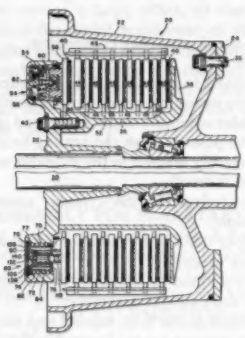
BRAKE ADJUST AND RESET APPARATUS

Richard J. Ditlinger, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.

Filed Oct. 22, 1975, Ser. No. 624,621

Int. Cl.² F16D 55/02, 65/52

U.S. Cl. 188—71.8 **6 Claims**



5. Automatic brake adjust and reset apparatus for a disc brake having an axially movable pressure plate for applying the brake comprising:

carrier means provided with at least one cavity; an annular housing disposed in said cavity and provided with an end wall;

spaced apart first and second stop means adapted to be engaged by said housing to establish limits to axial travel of said housing;

tubular means coaxially arranged with said housing and bearing against said end wall; and

cutting means secured to said pressure plate and engageable with said tubular means;

said housing being actuated into engagement with said second stop means in response to actuation of said cutting means by said pressure plate in a brake applying direction whereupon continued movement of said pressure plate results in motion of said cutting means axially through the wall of said tubular means to compensate for frictional wear of said disc brake;

said housing being actuated into engagement with said first stop means in response to actuation of said pressure plate in a brake release direction to establish a predetermined brake running clearance;

said tubular means including telescoping coaxial inner and outer tubular members arranged in radially spaced apart relationship;

said cutting means includes first and second cutting members operatively engaged with said inner and outer tubular members, respectively, an operative to cut axially

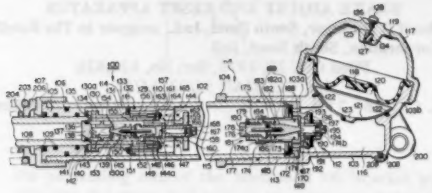
therethrough in sequential order in response to movement of said pressure plate.

4,010,829

HYDRAULIC SHOCK ABSORBER

Masaharu Naito, and Kazuhiko Nomura, both of Hamamatsu, Japan, assignors to Yamaha, Hatsudoki Kabushiki Kaisha, Japan

Filed Sept. 24, 1975, Ser. No. 616,415
Claims priority, application Japan, Sept. 30, 1974, 49-112557; Aug. 26, 1975, 50-103177
Int. Cl.² F16F 9/52
U.S. Cl. 188—278 **8 Claims**



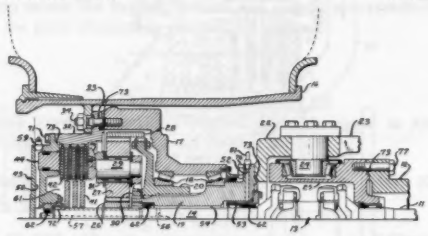
1. A hydraulic shock absorber comprising:
a cylinder assembly;
a sealing head fixed to one end of the cylinder assembly;
a piston assembly including a piston reciprocatively inserted into the cylinder assembly and a piston rod secured to the piston so as to pass through the sealing head;
a foot valve assembly housed in the cylinder assembly near the other end thereof;
a first chamber defined by the cylinder assembly, sealing head and piston;
a second chamber defined by the cylinder assembly, piston and foot valve assembly;
a third chamber defined by the foot valve assembly and the other end of the cylinder assembly;
a damping oil filled in the first, second and third chambers;
first undamping passage means formed in the piston assembly to establish communication between the first and second chambers;
first check valve means for allowing the free flow of damping oil from the second chamber into the first chamber through the first undamping passage means when the piston rod enters the first chamber;
first damping passage means formed in the piston assembly to provide communication between the first and second chambers, said first damping passage means including a first damping passage provided with a first opening-variable orifice and communicating at its one end with the first chamber, a second damping passage communicating at its one end with the other end of said first damping passage and a third damping passage provided with a first opening-fixed orifice, said third damping passage communicating at its one end with the other end of the first damping passage and at its other end with the second chamber;
a first heat-sensitive valve unit for changing the opening area of the first opening-variable orifice as a function of the temperature of damping oil; said first heat-sensitive valve unit is manually adjustably coupled to the piston assembly so as to change the initial opening area of the first opening-variable orifice;
second check valve means for allowing restricted flow of damping oil from the first chamber into the second chamber through the first and second damping passages when the first chamber has a higher pressure by a predetermined extent than the second chamber;
second undamping passage means formed in the foot valve assembly to establish communication between the second and third chambers;
third check valve means for allowing the free flow of damping oil from the third chamber into the second chamber through the second undamping passage means when the piston rod is withdrawn from the first chamber;
second damping passage means formed in the foot valve assembly to provide communication between the second and third chambers, said second damping passage means including a fourth damping passage provided with a second opening-variable orifice and communicating at its one end with the second chamber, a fifth damping passage communicating at its one end with the other end of the fourth damping passage and at its other end with the third chamber, and a sixth damping passage provided with a second opening-fixed orifice, said sixth damping passage communicating at its one end with the other end of the fourth damping passage and at its other end with the third chamber;
a second heat-sensitive valve unit for changing the opening area of the second opening-variable orifice as a function of the temperature of the damping oil; said second heat-sensitive valve unit is manually adjustably coupled to the foot valve assembly so as to change the initial opening area of the second opening variable orifice;
fourth check valve means for allowing restricted flow of damping oil from the second chamber into the third chamber through the fourth and fifth damping passages when the second chamber has a higher pressure by a predetermined extent than the third chamber; and
a reservoir filled with damping oil and communicating with the third chamber.

4,010,830

PLANETARY WHEEL DRIVE WITH ACCESSIBLE LOW-TORQUE DISC BRAKES

Anthony T. Logus, Chicago, and Ronald W. Barnhart, Elmhurst, both of Ill., assignors to Pettibone Corporation, Chicago, Ill.

Filed Apr. 11, 1975, Ser. No. 567,238
Int. Cl.² F16H 57/10; B60K 29/02
U.S. Cl. 192—4 A **4 Claims**



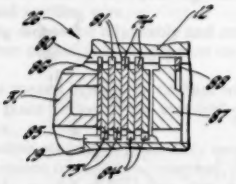
1. A readily accessible disc braking system for wheels with planetary wheel-drive, in which an axial drive spindle extending outwardly from its bearing carries a sun gear which drives planetary gears meshing on the inside of a stationary ring gear, the planetary gears rotating on orbiting pins moving with the wheel; said brake system being characterized by:
outer brake disc means located axially outwardly from said gears and removably locked to rotate with the wheel, inner brake disc means in braking engagement with the outer disc means during braking, and removably locked to rotate with the spindle, a removable cap located outwardly of the brake disc means, mounted to rotate with one of said brake disc means, and carrying hydraulic actuating means for the disc means, the removal of said cap giving access to said disc means and providing an opening adequate for disc-replacement; said brake disc means, when braking secures their respective rotative parts against relative movement, causing a lock-up of the planetary gears with the stationary ring gear.

4,010,831

TRANSMISSION FRICTION PLATE AND DEVICE

David F. Reuter, Oldham, England, assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 21, 1975, Ser. No. 634,253
Int. Cl.² F16D 13/52, 13/64
U.S. Cl. 192—70.2 10 Claims



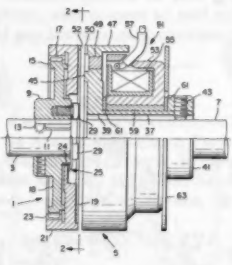
1. In a friction torque establishing device; an inner member having external splines; an outer member having internal splines; a plurality of annular flat friction plates having annular friction faces engaged in full surface engagement during engagement of the friction torque establishing device and inner and outer perimeters located radially between said members including a first set of alternate plates having external spline tangs splined to the internal splines of the outer member and a second set of intermediate plates having internal spline tangs splined to the external splines of the inner member; the plates of one of said first and second sets of plates being continuous annular plates and the plates of the other of said first and second sets of plates being open annular plates having a narrow gap extending completely through said open annular plates of said other set from the inner perimeter to the outer perimeter and axially from face to face to provide adjacent free end portions having rounded corner edges with the faces and providing a complete separation between the adjacent free end portions of said open annular plates of said other set.

4,010,832

RETURN SPRING FOR TEETH CLUTCH — TWO STAGE FORCE

John Frederick Puro, Elmira, N.Y., assignor to Facet Enterprises, Inc., Tulsa, Okla.

Filed June 24, 1975, Ser. No. 589,815
Int. Cl.² F16D 27/10
U.S. Cl. 192—84 C 1 Claim



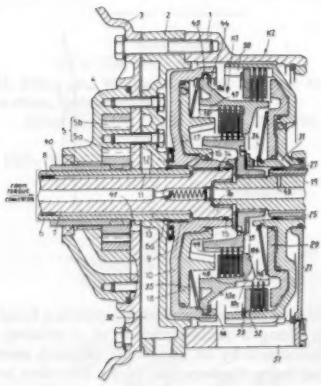
1. An electromagnetic clutch comprising:
a driven clutch member;
a driving clutch member mounted adjacent to said driven clutch member for communication with said driven member;
electromagnet actuating means mounted to said driven and driving clutch members for providing a driving engagement between said members when the electromagnet means is energized, said actuating means further comprising:
armature means;
a pair of magnetic poles mounted adjacent said armature means for drivably engaging said armature means;
mutually engagable driving teeth mounted to said armature means and one of said poles for engagement of said armature means to said one pole when said electromagnet means is energized,
said armature means further including a hub member, an electromagnetic armature mounted adjacent said hub member for communication therewith; a spline connecting said armature to said hub for providing relative movement between said hub and said armature; and
biasing means interposed said driven and driving clutch members for disengaging said actuating means when said electromagnet is deenergized, said biasing means further comprising;
first means for providing a force sufficient to overcome residual magnetism for initial break away, said first means having a plurality of wide spring-like fingers having a small offset;
second means for providing a smaller force sufficient to further separate said armature from said poles, said second means having a plurality of narrow spring-like fingers having a large offset, so that the spring force sufficient for initial breakaway of the armature from the poles is effective only during initial breakaway and the smaller spring force is thereafter effective; and
means for attaching said first and second providing means to said hub member whereby the spring-like fingers engage the armature.

4,010,833

CLUTCH ASSEMBLY FOR PLANETARY-GEAR TRAINS

Uwe Brendel, Kressbronn, and Manfred Bucksch, Friedrichshafen, both of Germany, assignors to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany

Filed Feb. 19, 1975, Ser. No. 551,053
Int. Cl.² F16D 25/10
U.S. Cl. 192—87.11 8 Claims



1. A clutch assembly for selectively coupling an input shaft with either of two nested output shafts coaxial therewith, comprising:
a first clutch housing on said input shaft open toward said output shafts and centered on the common shaft axis;
a generally cylindrical sleeve centered on said shaft axis and secured to said first clutch housing, said sleeve having an inner wall surface provided with peripherally spaced first ribs and an outer wall surface provided with peripherally spaced second ribs, said first clutch housing and said sleeve being two separate bodies provided with interfitted

peripheral formations and with retaining means holding said formations in mutual engagement;

a set of first annular friction foils in said sleeve slidably guided by said first ribs, said sleeve being integrally provided with an inner radial flange forming a backstop for one of said first friction foils, said second ribs extending across said flange and terminating in peripherally spaced-apart prongs overhanging said flange on the side remote from said first clutch housing;

an annular support on an extremity of the inner one of said output shafts proximal to said input shaft;

a set of first coacting annular foils interleaved with said first friction foils and slidably mounted on said support;

a second clutch housing on the outer one of said output shafts open toward said input shaft and centered on said shaft axis, said second clutch housing partly enveloping said sleeve;

a set of second annular friction foils on said sleeve slidably guided by said second ribs;

a set of second coacting annular foils interleaved with said second friction foils and slidably mounted in said second clutch housing;

abutment means on said second clutch housing forming a backstop for said second friction foils;

a first piston in said first clutch housing fluidically movable toward said support for jointly pressing said first friction foils and coacting foils against said flange; and

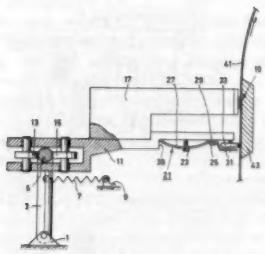
a second piston in said second clutch housing fluidically movable toward said support for jointly pressing said second friction foils and coacting foils against said abutment means.

4,010,834

PRINTING DEVICE COMPRISING A DISTANCE MEMBER

Ebbe Linder, Jarfalla, Sweden, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 23, 1976, Ser. No. 660,697
Claims priority, application Sweden, June 3, 1975, 7502473
Int. Cl.² B41J *3/05*
U.S. Cl. 197—1 R **3 Claims**



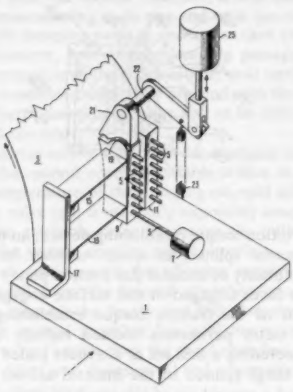
1. In a printing device comprising a printing head which is displaceable along a record carrier at a printing distance which is determined by an adjustable distance member, the printing head being displaceable in the direction to or from the record carrier by adjustment of said distance member for adjustment of the printing distance between the printing head and the record carrier, the improvement wherein the distance member comprises a contact member which contacts the record carrier during printing, and a leaf spring which is coupled to said contact member and which comprises an adjustable curvature in its longitudinal direction, the leaf spring being guided along and contacting, near both ends of the curvature, surface areas of the printing head, the connecting line between the two surface contact areas on the printing head being substantially transverse of the plane of the record carrier at the printing area.

4,010,835

MATRIX PRINT HEAD

Blair Robertson Martin, Owego, and Johann Hans Meier, Vestal, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 1, 1975, Ser. No. 600,985
Int. Cl.² B41J *3/04*
U.S. Cl. 197—1 R **7 Claims**



1. In a matrix printer for printing along a print line on a document,

a print head mounted to move along said print line, said print head having a plurality of longitudinally movable print wires operable to impact said document for printing thereon, and

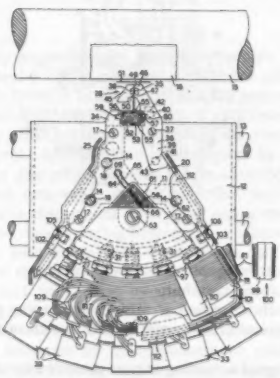
guide means on said print head adjacent said document receiving said print wires and positioning them in two arrays arranged in spaced relation, said guide means being translatable to change at least the vertical alignment of one of said arrays relative to the other.

4,010,836

WIRE PRINTING DEVICE

Francesco Bernardis, Ivrea, and Dario Bisone, Montalto Dora, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Mar. 14, 1975, Ser. No. 558,292
Claims priority, application Italy, Apr. 10, 1974, 68140/74
Int. Cl.² B41J *3/04*
U.S. Cl. 197—1 R **8 Claims**



1. In a wire printing device comprising a platen, a recording

medium supported by said platen, a carriage movable parallel to said platen, a base member removably mounted on said carriage, and a plurality of printing wires actuatable for striking said recording medium, each one of said wires having a terminal portion located in proximity to said recording medium and a first portion spaced from said terminal portion,

a plurality of electromagnetic actuating means, one of said electromagnetic actuating means being connected to said first portion of each of said printing wires to individually activate said printing wire,

first mounting means for adjustably and removably mounting each one of said actuating means on said base member,

central guide means in slidable contact with said printing wires at a point between said terminal portion and said first portion,

second mounting means for removably mounting said central guide means on said base member,

terminal guide means disposed in the proximity of said platen for guiding said terminal portion of said wires,

third mounting means for removably mounting said terminal guide means on said base member,

lubricating means for lubricating said printing wires during the slidable contact of said printing wires with said central guide means,

forth mounting means for removably mounting said lubricating means on said base member,

each one of said electromagnetic actuating means including a magnetic circuit comprising a tubular casing of a material of high magnetic permeability having a frontward threaded portion, an annular core of a nonmagnetic material disposed inside said tubular casing substantially coaxial thereto, said core having means defining a central bore, an excitable coil wound around said annular core between said core and said tubular casing, a cylindrically shaped armature disposed in said bore and movable between a rest position and a work position upon excitation of said coil, said armature having a front end connected to said first position of one corresponding of said printing wires and a front face and a rear end connected through a return spring to said tubular casing, a cylindrical stem of a material of high magnetic permeability having a rearward portion lodged in said central bore with a rear face in opposed relationship to said front face of said armature and defining a gap therebetween, said return spring loading said armature with a predetermined load into said rest position to be overcome upon excitation of said coil moving said armature to said work position, said stem having an axial bore substantially coaxial with said central bore for accommodating said one corresponding printing wire and a central threaded portion coupled with said frontward threaded portion of said tubular casing for axial movement with respect to said tubular casing for varying said gap between said armature and said stem.

4,010,837

SYLLABIC KEYBOARD CONTROLLED DEVICES

Jean Gremillet, 64 Avenue Felix Faure, Paris 15°, France

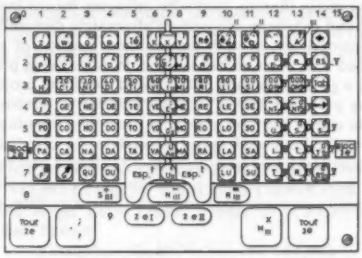
Division of Ser. No. 259,051, June 2, 1972, abandoned. This application Aug. 30, 1974, Ser. No. 502,184

Claims priority, application France, June 21, 1971, 71.22450

Int. Cl.² B41J *3/26, 3/51*

U.S. Cl. 197—7 **17 Claims**

5. A keyboard-controlled device including a syllabic keyboard certain keys of which can be simultaneously depressed, certain of said keys being each provided with means for simultaneously controlling several characters belonging to different character groups each of said groups corresponding to a distinct printing point, one other of said keys at least being provided with means for controlling a spacing and other of said keys being each provided with means for controlling a subsidiary function, all said keys being each provided with an electronic switch, the device including several coding matrices to which the keyboard is connected, so that said keyboard transmits simultaneously to said matrices pulses corresponding to characters, to spacings, and to subsidiary functions, which are assigned to the simultaneously depressed keys; the device including a buffer storage unit to which the coding matrices are connected, so that said coding matrices send to said buffer storage unit codes corresponding to said characters, spacings, and subsidiary functions respectively the buffer storage unit comprising a tape (FIG. **18**) which constitutes a storage medium and means (FIGS. **24** and **18**) for recording simultaneously in successive transversal lines of said tape the codes corresponding to the characters, to the spacing and to subsidiary functions, assigned to the simultaneously depressed keys, and means for advancing the tape by jumps (FIGS. **2** to **6**, **10** to **12** and **18**, **19**), the length of each jump corresponding to the number of transversal lines occupied by said codes; the different lengths of the jump-wise advance of the tape being obtained (FIGS. **18** and **19**) by means comprising an escapement wheel having movable cogs which are movable on said wheel, from a stop position to an escapement position, and in which the escapement obtained is proportional to the number of the cogs displaced from a stop position to an escapement position (FIGS. **2-6** and **10-12**), the wheel being optionally combined with an escapement anchor (FIGS. **5** and **6**) in order to augment the total escapement by a single interval.



4,010,838

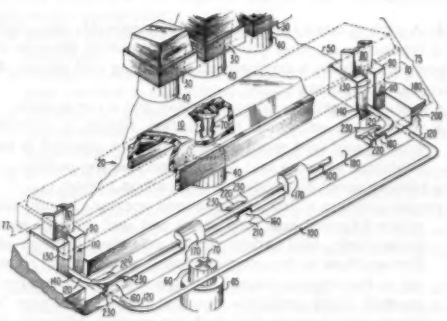
SPACER BAR MECHANISM

Dewey M. Sims, Jr., Westland, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Jan. 17, 1975, Ser. No. 541,790

Int. Cl.² B41J *5/08*

U.S. Cl. 197—98 **8 Claims**



1. A spacer bar assembly for an electronic keyboard having a base member and a plurality of actuatable keys, said assembly comprising:

a. an elongated spacer bar,

b. an electronic switch operatively positioned underneath said spacer bar,

c. a spring loaded actuating shaft centrally fixed to the underside of said spacer bar and disposed in actuating relationship with said electronic switch, the spring loading of said shaft being effective for yieldably supporting said spacer bar in a raised inoperative position relative to said switch,

d. a U-shaped wire bail having a linear central portion pivotally anchored to said base member and a pair of offset leg extremities operatively coupled to the extremities of said spacer bar, and

e. wire engaging means formed in said base member for pivotally anchoring said linear central portion of said U-shaped bail and further for applying a constant undulating stress thereto, said wire engaging means including land and overhang projections alternately disposed along the pivotal axis of said central linear portion of said U-shaped bail, each of said land projections being provided with a guide slope and each of said overhang projections being provided with a yieldably restrictive opening, said guide slopes and said yieldably restrictive openings serving to facilitate and to accommodate the installation of said central linear portion of said U-shaped bail between said land and overhang projections upon the application of tactile pressure to said central linear portion of said bail.

4,010,839

CARTRIDGE FOR A RIBBON OF A TYPEWRITER OR LIKE OFFICE MACHINES

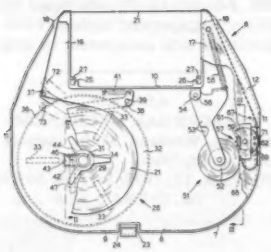
Giampaolo Guerrini, Ivrea (Turin), and Giuseppe Corna, Candia (Turin), both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Nov. 25, 1975, Ser. No. 635,223

Claims priority, application Italy, Nov. 25, 1974, 70426/74

Int. Cl.² B41J *33/04, 35/36*

U.S. Cl. 197—151 **12 Claims**



1. A carbon coated ribbon cartridge removably mountable in a typewriter or other printing office machine wherein the typewriter includes a driving shaft for driving said ribbon, the cartridge comprising:

a container having a bottom portion and a top portion;

a feed spool on which said carbon ribbon is normally wound, said feed spool being rotatably supported in said container between said bottom and said top portion;

a take-up spool for receiving said carbon ribbon;

means defining a first and a second aperture in said container adjacent said feed spool and said take-up spool, respectively, said carbon ribbon extending through said first aperture to the exterior of said container and returning to the interior thereof through said second aperture;

a toothed roller rotatably mounted in said container between said bottom and said top portion adjacent said take-up spool, said toothed roller having a connecting portion engageable with the driving shaft of the machine;

means defining an opening in the bottom portion of said container, alignment with said toothed roller so as to enable said driving shaft to engage the connecting portion of said toothed roller for the rotation thereof, during use;

a support member movably mounted in said container between said bottom and top portion and on which said take-up spool is rotatably mounted; and

resilient means acting on said support member for holding an outermost turn of said carbon coated ribbon wound on said take-up spool in engagement with said toothed roller for the winding of said carbon coated ribbon on said take-up spool in response to the rotation of said driving shaft.

4,010,840

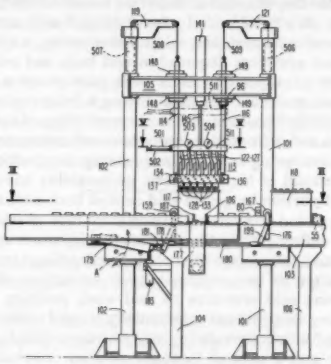
AUTOMATIC AIR LEAK TESTING APPARATUS FOR MULTIPLE CHAMBERED CONTAINERS

William J. Eberle, Reading, Pa., assignor to General Battery Corporation, Reading, Pa.

Continuation-in-part of Ser. No. 475,273, May 31, 1974, Pat. No. 3,938,368. This application Aug. 18, 1975, Ser. No. 605,271

Int. Cl.² B65G *47/24*

U.S. Cl. 198—345 **6 Claims**



1. In a system for processing batteries, apparatus for longitudinally conveying a battery to at least one predetermined position comprising:

a. a conveyor surface defined by a plurality of transverse rollers in a roller means, a first one of said rollers being pivotally connected about an adjacent second one of said rollers,

b. a first actuating means for pivoting said first one of said rollers upwardly and above said adjacent second one of said rollers to a reference position, whereby longitudinal movement of a battery along said rollers is halted by said first one of said rollers,

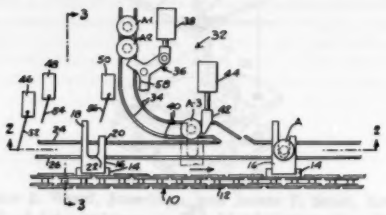
c. sensing means for selectively making a determination of the longitudinal dimension of said battery in said halted position, and

d. a second actuating means coacting with said first actuating means and said sensing means for repositioning said first one of said rollers with respect to said second one of said rollers in response to said determination to thereby reposition said battery with respect to a preselected vertical axis along the longitudinal advancement of said battery.

4,010,841
FORKED WORK-CARRIER CONVEYOR MECHANISM

Eugene P. Bonzack, Livonia, Mich., assignor to F. Jos. Lamb Company, Warren, Mich.

Filed Mar. 21, 1975, Ser. No. 560,716
Int. Cl.² B65G 47/00
U.S. Cl. 198—357 15 Claims

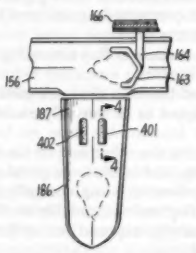


1. A conveyor mechanism for transporting workpieces of the type having a head and a depending stem of narrower cross section than the head comprising, a plurality of workpiece carriers, conveyor means for causing the carriers to move along a desired path, each carrier having a pair of arms spaced apart in the direction of travel of the carrier to receive the stem of a workpiece therebetween, said carrier being adapted to support the workpiece by engaging the underside of the head of the workpiece with the stem extending downwardly between said arms, the trailing arm on each carrier extending outwardly beyond the free end of the leading arm on the carrier a distance at least equal to the dimension of the workpiece stem in a direction transversely of the path of travel of the carrier, a loading station for said carriers comprising means for delivering workpieces to a pick up position adjacent the path of travel of the carriers and wherein the stem of the workpiece at said work pick up position is located in the path of travel of the trailing arm of a carrier and means at said pick up position cooperating with the trailing arm of the carrier for deflecting the workpiece at said pick up positiion in a generally horizontal plane onto the carrier in response to traversing of the carrier past said pick up position.

4,010,842
MACHINE FOR ORIENTING PEARS

Laurence H. Smith, Lafayette, Calif., assignor to Atlas Pacific Engineering Company, Emeryville, Calif.

Continuation-in-part of Ser. No. 407,468, Oct. 18, 1973, abandoned, which is a division of Ser. No. 267,017, June 28, 1972, Pat. No. 3,797,639. This application Aug. 18, 1975, Ser. No. 605,283
Int. Cl.² B65G 47/24
U.S. Cl. 198—394 1 Claim

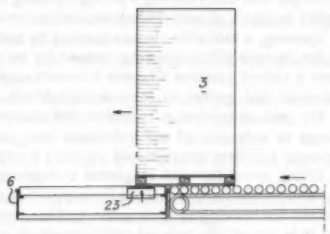


1. In a pear feeding and orienting apparatus, a chute having an upper end and a lower end and having a cross-section with a curved base portion whose radius of curvature is substantially larger than the radius of curvature of the bulb portion of the largest pear to be handled and with upwardly projecting side portions spaced apart a distance at least as great as the length of the largest pear to be handled, said chute being disposed longitudinally at a predetermined downward inclination, the improvement comprising at least two strips of small size in relation to the size of the chute and secured on the chute adjacent the upper end thereof and extending along the run of the chute spaced apart on either side of the central axis of the chute, said strips extending over a small portion only of the chute and each strip having a continuous surface of a predetermined frictional coefficient greater than that of the chute such that a pear aligned lengthwise with said chute and with its stem end in leading disposition will slide along said chute in such position, but a pear with its blossom end in leading disposition will engage the spaced strips and be caused to roll over into stem end leading disposition, and means for feeding pears in spaced relationship through said chute.

4,010,843
DEVICE FOR TRANSFERRING A LOAD FROM ONE CONVEYOR TO A SECOND CONVEYOR

Raymond Roger Louis Lucas, Avenue de la Republique, 33 Prechac, France

Filed Mar. 13, 1975, Ser. No. 558,013
Claims priority, application France, June 20, 1974, 74.22546
Int. Cl.² B65G 47/54
U.S. Cl. 198—487 10 Claims



1. A device for transferring a load between a first roller conveyor and a second roller conveyor perpendicularly-disposed thereto, said first and second roller conveyors including a plurality of rollers parallel to each other in said conveyor, said first roller conveyor comprising a frame supporting said plurality of rollers, said first roller conveyor having an end portion adjacent a side edge of said second roller conveyor, said device comprising:

a chassis positioned below said rollers of said first roller conveyor;

a carriage mounted in said chassis for movement along a path parallel to said rollers of said first conveyor;

a plurality of supporting elements parallely disposed between rollers of said first roller conveyor, each of said supporting elements being mounted to said carriage;

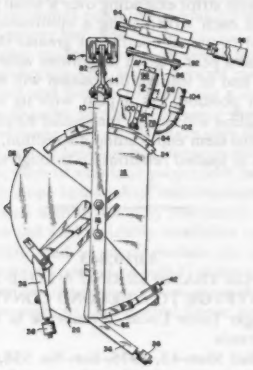
a drive means for reciprocally driving said carriage along said path between a first position wherein said supporting elements are spaced from said end portion of said second roller conveyor to a second position wherein said supporting elements are proximate to said end portion of said second roller conveyor; and

means for vertically lifting said carriage relative to said frame of said first roller conveyor between a first position wherein said support elements lie below the upper horizontal plane of said rollers of said first roller conveyor to a second position wherein said support elements lie above said upper horizontal plane of said rollers of said first roller conveyor.

4,010,844
MATERIAL HANDLING CONVEYOR LOADER

John Meredith Leach, P.O. Box 341, Port Jefferson, N.Y. 11777

Filed Jan. 27, 1975, Ser. No. 544,419
Int. Cl.² B65G 47/19
U.S. Cl. 198—562 4 Claims



1. A bulk material handling system comprising a supporting conveyor, material holding magazines supported at intervals by said conveyor and each having a filling opening therein, a gasket carried by each of said magazines and surrounding its said filling opening, a movable closure carried by each of said magazines for its said filling opening, means for moving said closure from a closed position wherein it covers said opening and coacts with said gasket to form a completely dust-free enclosure for said magazine to prevent the escape of any material from or entrance of any substance into said magazine, to an open position wherein said opening is exposed, an extensible filling spout for said magazine comprising a fixed section and a movable section, means for supporting said fixed section, means for moving said movable section from a position where it is out of the way of said closure to a position where it tightly contacts the same said magazine gasket and covers said filling opening to completely prevent any escape of material and dust during the magazine filling operation, and means for driving said conveyor intermittently to move each of said magazines into filling position, stop each of them until filled and then move each filled magazine ahead and at the same time move the next empty magazine into filling position, and repeat this cycle indefinitely.

4,010,845
COIN HOLDER

Samuel Bloomfield, P.O. Box 4500, Palm Springs, Calif. 92262

Filed Apr. 28, 1975, Ser. No. 572,129
Int. Cl.² A45C 11/28
U.S. Cl. 206—.82 6 Claims

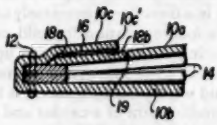
1. A coin holder comprising a first transparent plate, a second transparent plate, a support plate disposed between said first and second transparent plates, said support plate having a viewing aperture therein and a plurality of slots radially disposed about and communicating with said viewing aperture, a corresponding plurality of elongated coin supporting arms disposed within said slots, at least one of said arms being slidably mounted within one of said slots and each of said arms defining prongs at the innermost extended end thereof for contacting a coin disposed within said viewing aperture at the juncture of the rim and edge portions thereof and having a transverse width substantially less than the longitudinal length thereof for minimizing the visual obstruction of the edge portion of said coin and means for securing said

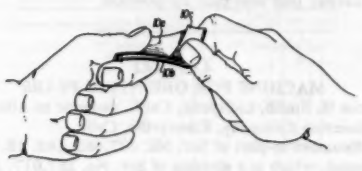
transparent plate about said support plate and supporting arms.

4,010,846
SAFETY MATCH BOOK

James Henry Parsons, 4715 N. Forest Road, Hixson, Tenn. 37343

Filed Nov. 20, 1975, Ser. No. 633,985
Int. Cl.² A24F 27/00
U.S. Cl. 206—108 31 Claims





1. A safety match book comprising:

a match book cover comprising:

an openable and closable front panel closure flap;

a back panel connected at one end to one end of said front panel closure flap;

an imperforate retainer flap extending from the other end of the back panel;

matches secured between the back panel and the retaining flap and adapted to be partially enclosed by the closure flap;

a friction strip on the other end of the front panel closure flap, said other end of the front panel closure flap and the friction strip thereon being normally positioned between the retainer flap and the matches so that the friction strip is not sufficiently exposed for striking of the matches thereon; and

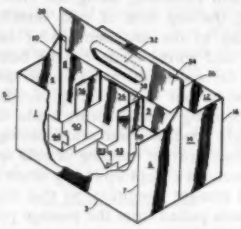
means, completely covered by the retainer flap when the front panel closure flap is closed, for releasably interconnecting the other end of the closure flap and the retainer flap whereby the friction strip can only be exposed for striking of the matches thereon by release of the intercon-

necting means so that the other end of the closure flap and the friction strip thereon can be removed from normal position between the retainer flap and the matches.

4,010,847
ARTICLE CARRIER

Prentice J. Wood, Jonesboro, and James T. Stout, Acworth, both of Ga., assignors to The Mead Corporation, Dayton, Ohio

Filed Dec. 19, 1975, Ser. No. 642,370
Int. Cl.² B65D 5/48, 85/30
U.S. Cl. 206—187 3 Claims

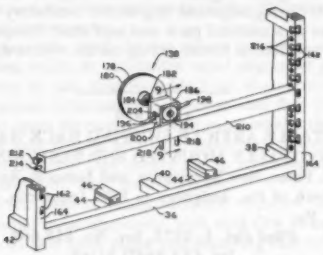


1. An article carrier comprising a bottom wall, side walls foldably joined to the side edges of said bottom wall, end wall panels foldably joined to the end edges of said side walls and extending inwardly therefrom, medial partition structure at one end of the carrier comprising a pair of medial panels foldably joined respectively to said end wall panels at said one end of the carrier along the edges thereof remote from said side walls and extending medially inward of the carrier, medial partition structure at the other end of the carrier comprising a pair of medial panels foldably joined respectively to said end wall panels at said other end of the carrier along the edges thereof remote from said side walls and extending medially inward of the carrier, a multiple ply handle comprising at least one pair of handle panels and secured at its ends respectively to said medial partition structure at each end of the carrier, a first medial partition panel foldably joined to one of said medial panels at said one end of the carrier, a second medial partition panel foldably joined to one of said medial panels at said other end of the carrier, the inner portion of said first medial partition panel being disposed in flat face contacting relation with the inner portion of said second medial partition panel to form a double thickness partition midway between the ends of the carrier, a pair of first transverse partition panels foldably joined respectively to a pair of said medial panels and disposed on each side of said handle, a pair of anchoring tabs secured respectively to said side walls, a pair of second transverse partition panels foldably joined respectively to said pair of anchoring tabs, the adjacent end portions of the associated pairs of said first and second transverse partition panels being foldably joined respectively to each other and being disposed in overlapping face contacting relation to form double thickness partitions midway between the side walls and handle, a portion of each of said anchoring tabs being struck from the associated one of said medial panels to form apertures therein, and portions of said medial partition panels being disposed in substantial coincidence with said apertures.

4,010,848
FRONT RESTRAINT DEVICE FOR SHIPPING BINS

Walter E. Pater, New Kensington, and James R. Rowley, Freeport, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 488,851, July 15, 1974, Pat. No. 3,963,122. This application Dec. 11, 1975, Ser. No. 639,727
Int. Cl.² B65D 85/48
U.S. Cl. 206—448 13 Claims



1. A mechanical restraint device for dampening oscillatory and lateral forces acting on a plurality of automotive backlites during shipment, wherein the articles are supported on a first edge and tilted toward a back support member and wherein the oscillatory forces move the backlites about the first edge toward and away from the support member along a first movement path and the lateral forces move the backlites away from the support member along a second movement path comprising:

a rigid member having a first major surface opposite to a second major surface;

a resilient pad mounted on the first major surface of said member;

a threaded shaft having one end pivotally mounted to the second major surface of said rigid member;

a housing for receiving the second end of said threaded shaft and having a groove in at least one pair of opposed surfaces;

a nut mounted on the second end of said shaft to detachably secure said shaft in said housing;

a nest mounted in said housing for receiving said nut and for preventing rotation of said nut;

a plurality of disc springs mounted on said shaft in said housing;

a washer mounted in said housing against biasing action of said disc springs to urge said disc springs against said nut in said nest;

means for mounting said housing in the first and second movement path such that said resilient pad engages the backlites; and

a finger member passing through each of the grooves of said housing and securably mounted to said washer for maintaining said springs in compression against said nut wherein rotating said shaft out of the housing moves said pad against the outermost backlite against biasing action of said springs to urge the backlites together against the back support member and urging said finger members toward the backlites along the grooves moves said washer against said springs to increase the biasing action of said springs on said shaft by way of said nut such that the backlites respond to the oscillatory and lateral forces as a unitized pack and to dampen oscillatory forces and lateral forces acting on the articles during shipment.

2. In a bin for shipping loose sheets, wherein the bin is of the type having a back support secured to a base for supporting each of the sheets on an edge in a generally vertical position in facing relationship to one another, the improvement comprising:

a rigid member having an engaging surface and a major surface opposite to the engaging surface;

a spring biased shaft having one end mounted to the major surface of said rigid member;

means mounting said shaft for securing said shaft in spaced relation to the back support and the base with the engaging surface of said member facing the back support; and

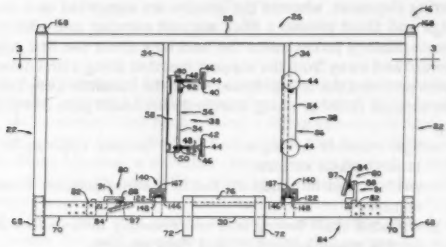
means acting on said shaft for moving the engaging surface of said member toward the back support wherein the engaging surface engages outermost one of the plurality of sheets to be shipped, said spring biased shaft urging said rigid member against the outermost sheet to urge the sheets together against the back support such that the sheets during shipment respond to oscillatory and lateral forces as a unitized pack and said shaft dampens oscillatory and lateral forces acting on the sheets during shipment.

4,010,849

NESTABLE ARTICLE SHIPPING RACK HAVING PIVOTALLY MOUNTED END RESTRAINTS

Walter E. Pater, New Kensington, and James R. Rowley, Freeport, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 1, 1975, Ser. No. 618,609
Int. Cl.² B65D *85/48*
U.S. Cl. 206—448 **19 Claims**



1. In a rack for shipping articles wherein the rack is of the type having a base and a pair of end restraint means mounted in opposed spaced relationship on the base to limit longitudinal motion of the articles to be shipped, the improvement comprising:

each of the end restraint means comprising:

a rigid member pivotally mounted to the base for movement in a first direction toward the plane of the base and in a second opposite direction away from the plane of the base;

a rigid plate mounted on said rigid member; and

biasing means mounted between the base and said rigid member as it moves in the second direction, said biasing means responsive to the movement of said rigid member as it moves in the second direction to urge said rigid member in the first direction.

4,010,850

DEVICE FOR SUSPENDING OBJECTS

Curt Hardy Persson, Brannerigatan 5, S-282 00 Tyringe, Sweden

Continuation-in-part of Ser. No. 512,938, Oct. 7, 1974, abandoned. This application Nov. 14, 1975, Ser. No. 631,948
Int. Cl.² A47B *53/00*
U.S. Cl. 211—1.3 **3 Claims**

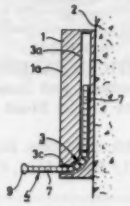
1. A device for suspending objects, comprising:

a body having at least one inner passage provided with a portion directed longitudinally of the body, a portion directed laterally toward and opening into one of the long sides of said body, and a curved intermediate portion; and

a suspension arm normally disposed in said inner passage and movable into and out of said passage, said suspension arm comprising:

a. an elongated, flexible, continuous spring blade presenting an unbroken upper surface and adapted to be bent upwardly when said arm passes said curved intermediate portion in case of a displacement of said arm in said passage; and

b. a plurality of vertebra-like members attached to said spring blade and arranged in side-to-side abutting relationship to prevent downward bending of said spring blade beyond a condition wherein said blade is straight, each of said members having on one side a projection and on an opposite side a recess, said projections and said recesses on adjacent members being arranged to interengage when said members are brought into abutting rela-



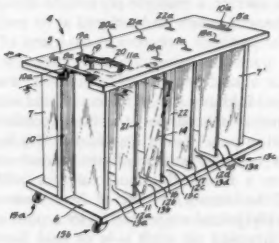
tionship and extending along the entire height of said members, the top face of said vertebra-like members being fixed to the undersurface of said spring blade, whereby said spring blade can be bent in the upward direction for moving the arm through said curved portion of said body, but said abutting vertebra-like members prevent bending of said spring blade downwardly from said straight condition, and said interengaged projections and recesses prevent bending of said spring blade in all other directions except upwardly when said spring blade is in said straight condition, so that the portion of said spring blade pulled from the passage presents an unbroken upper surface and maintains a straight shape without yielding when objects are suspended therefrom.

4,010,851

COLLAPSIBLE PAINTER'S CANVAS FRAME HOLDER RACK

Alma Doris Erikson, 328 W. 17th St., New York, N.Y. 10011

Filed Jan. 15, 1975, Ser. No. 541,159
Int. Cl.² A47F *5/10*
U.S. Cl. 211—189 **5 Claims**



1. A collapsible painter's canvas frame holder rack comprising in combination: a lower sheet structure and a separate upper sheet structure, an upper face on the lower sheet structure having female receptacles some of which female receptacles are spaced along the upper surface at first predetermined intervals substantially in linear alignment along an axis extending transversely along a width of the lower sheet structure, and spaced apart at second predetermined intervals along a longitudinal axis of the lower sheet structure, the upper sheet structure having female receptacles on a lower face thereof

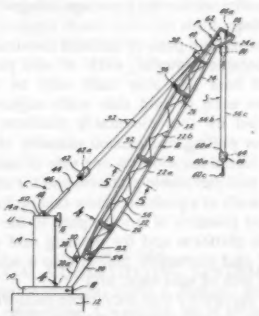
positioned substantially as a mirror image of the upper face of the lower sheet structure such that when the upper sheet structure is positioned with its lower face in substantial alignment over the upper face of the lower sheet structure said female receptacles of the upper sheet structure are in substantially opposing relationships to one-another spaced-apart from one-another, and a plurality of at least three upright support sheets extending substantially parallel to one-another and said support sheets including opposite end support sheets and at least one intermediate upright support sheet all having each of opposite upper and lower ends shaped to define male inserts shaped to detachably lock into the female receptacles of the upper sheet structure and the lower sheet structure respectively at least first ones of the other of said female receptacles being located on each of said lower and upper sheet structures and being elongated along other transverse axes thereof and at least second ones of the other of said female receptacles being located on each of said sheet structures and being elongated along another longitudinal axis and intersecting said first ones of said female receptacles at substantially right angles thereto, and at least the two support sheets of the opposite ends each having its male insert at both ends thereof elongated along a linear axis of a width of the respective upper and lower sheet structures and received within said first ones of said female receptacles, a pair of support strips having a male insert at each of the ends thereof mounted within said second ones of said female receptacles, said support strips extending at right angles to and engaging the respective ones of said two support sheets at the opposite ends, whereby said plurality of sheet structures are braced against shifting with the support sheets mounted uprightly with their respective longitudinal axes extending between the upper and lower sheet structures respectively, and whereby a plurality of side-by-side support channels defining through-spaces are formed between the at least three parallel upright support sheets.

4,010,852

SHEAVING ARRANGEMENT

John B. Goss, 7627 Beech Cove Lane; William D. Morrow, 10206 Amblewood, both of Houston, Tex. 77072, and Jack W. Corbett, 210 E. Vermilion Parkway, Lafayette, La. 70501

Filed May 30, 1975, Ser. No. 582,185
Int. Cl.² B66C *23/00*
U.S. Cl. 212—8 R **9 Claims**



1. A crane having a boom with a boom point at the extremity thereof, a load hoist cable, a load hoist, a traveling block and multiple sheave means for said cable, the improvement residing in said sheave means, comprising:

first fixed sheave means located with the boom point of said boom over which said cable passes from said load hoist;

first movable load sheave means mounted with said traveling block about which said cable passes from said first fixed sheave means;

second fixed sheave means located in proximity to said first fixed sheave means with said boom point but outwardly from said first fixed sheave means;

said first fixed sheave means mounted adjacent the boom point of said boom in a first plane substantially parallel to the longitudinal axis of said boom;

said second fixed sheave means being in a plane substantially perpendicular to said first plane;

third fixed sheave means mounted adjacent the boom point substantially in said second plane in substantial radial alignment with and adjacent to said second fixed sheave means and receiving said cable passing from said second fixed sheave means;

second movable load sheave means mounted with said traveling block in substantial axial alignment with and adjacent to said first movable load sheave means in a third plane substantially parallel to said first plane and spaced apart therefrom at least substantially the diameters of said second and third fixed sheave means, said second movable load sheave means receiving said cable from said third fixed sheave means;

fourth fixed sheave means mounted adjacent to and in substantial axial alignment with said first fixed sheave means in said third plane and receiving said cable from said second movable load sheave means; and,

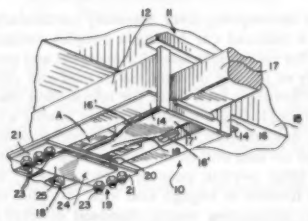
said second and third fixed sheave means, respectively, being laterally spaced from said first and fourth fixed sheave means, respectively, a distance approximately equal to the diameter of said first and second movable load sheave means, respectively, for thereby spacing the cable lengths from said first and second movable load sheave means, respectively, apart such distance to prevent spinning of said traveling block and twisting of said cable when raising and lowering said traveling block.

4,010,853

DRAFT GEAR CARRIER FOR RAILWAY CARS

Franklin P. Adler, Michigan City, Ind., assignor to Pullman Transport Leasing Company, Chicago, Ill.

Filed July 24, 1975, Ser. No. 599,238
Int. Cl.² B61G *7/10, 9/20*
U.S. Cl. 213—61 **1 Claim**



1. For a railway car having a center sill including a top wall, horizontally spaced vertical side walls and lower connecting means, a draft gear including a yoke reciprocates essentially longitudinally, the improvement comprising:

a draft gear carrier having a substantially flat plate with laterally spaced end connector portions and first and second wear portions offset from opposite sides of the plate,

said wear portions each having a length substantially greater than the width of the yoke and extending substantially the length of the spacing between the vertical side walls of the center sill,

means for initially releasably connecting the end connector portions to the respective connecting means on the side walls of the center sill with its first wear portion beneath and in engagement with said yoke,

said wear portion initially having essentially flat wear surfaces,

said yoke at least in the area of engagement with the carrier being narrower than the width of said wear portions,

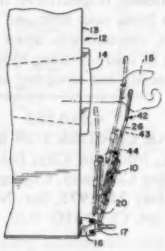
means for restricting movements of the yoke laterally substantially less than the lengths of said wear portions whereby said yoke in operation develops a wear pattern on the first wear portion that forms a transversely arcuate depression essentially centered on the first wear portion and leaving unworn lateral thick edge portions of substantially original thickness on said first wear portion flanking said depression,

said carrier being adapted to be reversed to position the second offset wear portion beneath and in engagement with said yoke upon predetermined wear on said first wear portion and disposing said wear portion on the bottom of the carrier with said arcuate depression facing downwardly and defining an upwardly bowed strength-imparting arch-like structure centered between said unworn thick edge portion of the carrier which serve as buttresses for the arch like structure.

4,010,854
UNCOUPLING LEVER ASSEMBLY

Leonard Francis Manyek, Lansing, Ill., assignor to Stanray Corporation, Chicago, Ill.

Filed June 5, 1975, Ser. No. 583,870
Int. Cl.² B61G 3/08
U.S. Cl. 213—166 6 Claims

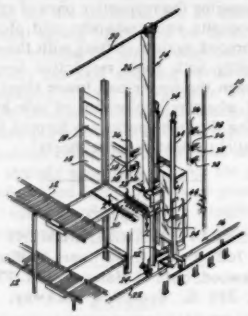


1. An uncoupling lever assembly particularly adapted for use on a railroad car having a coupler mounted at an end thereof for side to side lateral movement and movement longitudinally of the car in response to buff and draft forces, said coupler having a lock lifter for uncoupling the coupler, said assembly including a handle member having a handle portion at one end thereof, said handle member being pivotally mounted on said end of said car, a lock lifter member having a lock lifter portion near one end thereof, said lock lifter portion formed to engage said lock lifter for support by said coupler, connecting means disposed generally intermediate said handle portion of said handle member and said lock lifter portion of said lock lifter member to connect said handle member to said lock lifter member, near an opposite end of each, in adjacent, generally parallel relationship to allow their axial movement relative to one another while allowing turning torque to be transmitted from said handle member pivoted relative to said car to said lock lifter member to uncouple said coupler, said connecting means including guide means formed to maintain said opposite ends of each of said handle member and said lock lifter member in said parallel relationship, by limiting the vertical and lateral movement of said members, and bearing means, mounted within said guide means to be engaged by said handle member and said lock lifter member to facilitate relative axial movement of said members and to reduce wear, said bearing means including bearing pads formed from a resilient material in a generally U-shaped configuration, having a bottom surface and two side surfaces formed by generally vertical legs, said legs having a slightly outward pitch such that they may be snapped into said guide means to engage an interior side surface of said guide means with a sufficient force to maintain said bearing pad within said guide means during operation of said uncoupling lever assembly, each of said bearing pads being slightly longer in length than a corresponding one of said guide means and having outwardly extending flanges at opposite ends thereof, said flanges engaging exterior end surfaces of said guide means to prevent longitudinal movement of said bearing pad relative to said guide means.

4,010,855
WAREHOUSE SYSTEM WITH PAN TRANSFER APPARATUS

Joseph F. Smith, Freckleton near Preston, England, assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed Feb. 27, 1975, Ser. No. 553,537
Int. Cl.² B65G 47/00
U.S. Cl. 214—16.4 A 5 Claims



1. In a warehouse system an operable shuttle, said shuttle having an elevatable platform and movable along an aisle with horizontal storage racks on each side thereof, said racks including a plurality of vertical storage compartments therealong comprising:

a plurality of storage pans of unitized construction for containing storable material, each of said pans having an integrated base and side walls with an engagable lip formed on each of said side walls adjacent the aisles;

means carried by said elevatable platform for engaging said lip for pulling one of said plurality of storage pans from a selected location on one side of said aisle toward and onto said elevatable platform and for engaging one of said side walls at a position below said lip for pushing said one of said plurality of storage pans to the center of said elevatable platform and for pushing said pan from said center of said elevatable platform to a selected location on either side of said aisle; and

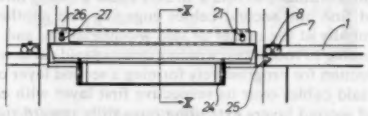
said means carried by said elevatable platform comprises a pair of side by side counter rotating chains movable in a common horizontal plane each having one lip engaging pin for pulling and two substantially shorter pins for pushing said pans from said elevatable platform, the axes of rotation of said chains being substantially parallel with said pins and vertical storage compartments, said elevatable platform including a pair of angle supports having their aisle ends downward sloping for supporting and guiding said one of said plurality of pans while on said shuttle and said pins movable in an endless horizontal path around said supports.

4,010,856

STORAGE APPARATUS WITH SLIDE ASSEMBLIES AND A TRANSPORTATION DEVICE WITH PIVOTAL CONVEYOR MEANS

Leif Per Roland Anderson, Bogatan 39 A, 412 72 Goteborg, Sweden

Filed May 27, 1975, Ser. No. 580,699
Int. Cl.² E04H 6/06
U.S. Cl. 214—16.4 A 2 Claims



1. Arrangement in connection with storage establishments for unit loads comprising a number of storage compartments for reception of the unit loads and at least one transportation device arranged to service the storage compartments, said transportation device being movable along the storage compartments and having a platform movable between different levels and provided with first supporting means arranged to support the unit loads, said device further having sidewardly pushing means mounted on said platform and arranged to transfer the unit loads respectively into their storage compartments and vice versa, said storage compartments including second supporting means having sliding devices arranged to receive one edge of the unit load respectively at the side of the storage compartment from which the unit load is intended to be introduced by means of the transportion device and carry said edge during the introduction of the unit load into the storage compartment respectively, said transportation device including means to support and displace a second edge of the unit load within a range of the transportation device which substantially occupies a position outside of the storage compartments, said transportation device including further means for the transfer of the last mentioned edge of the unit load from said range within the main part of the transportation device to the outside edge of the storage compartment and vice versa, means on said platform with said supporting means of said transportation device being pivotable around a common axis, substantially horizontally and transversely arranged in relation to the sidewardly pushing means, enabling the unit load to be tilted and one of said edges to be tilted upwardly upon sidewardly displacement of same to and from a position above said sliding devices, and upon lifting from said sliding devices to be brought down onto the sliding devices by tilting downwardly.

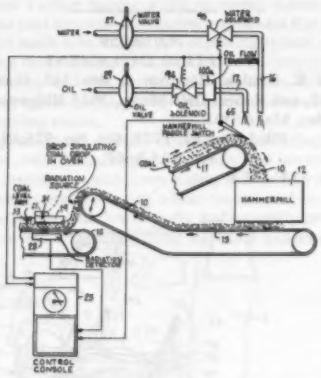
4,010,857

COAL CONDITIONING SYSTEM

Thomas E. Reim, Willowick; Jerry J. Pollack, Brookpark, and Robert A. Kemmerling, Cleveland, all of Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio

Division of Ser. No. 720,057, April 10, 1968, abandoned. This application Oct. 29, 1970, Ser. No. 85,238
Int. Cl.² F23K 3/00
U.S. Cl. 214—18 R 9 Claims

1. A system for detecting the bulk density of coal supplied to an oven, wherein the coal is dropped into the oven, comprising means for providing a moving stream of coal to a detecting station which detects the bulk density of the coal passing through the station and thence to the oven, and means adjustably positioned before the detecting station for conditioning the coal so that it is in substantially the same bulk



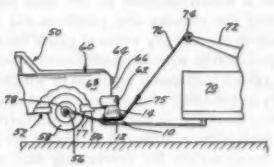
density condition in the detecting station as it is when dropped into the oven.

4,010,858

METHOD AND MEANS FOR TOWING A VEHICLE

Carl F. Mahnke, Jr., Chicago, Ill., assignor to Vicar Industries Incorporated, Chicago, Ill.

Filed July 14, 1975, Ser. No. 595,523
Int. Cl.² B60P 3/06
U.S. Cl. 214—86 A 14 Claims



1. A device of the kind described comprising,

a vehicle comprising a chassis and a body structure mounted above said chassis having opposite ends and wheels adjacent said opposite ends, said body structure having opposite end portions extending beyond said ends of said chassis;

boom means having one end above and adjacent one end of said body structure;

at least one elongated flexible towing member having securing means on one end thereof, said securing means being detachably secured to said chassis adjacent one end thereof and said towing member extending from said point of attachment outwardly below and beyond said end portion of said body structure, and thence upwardly to said boom means;

power means associated with said boom means and connected to said towing member for pulling said towing member upwardly to said boom means to cause lifting of said one end of said vehicle;

a towing cushion positioned between said towing member and said body structure for preventing said towing member from engaging said body structure, said towing cushion comprising an elongated yieldably compressible cushion member extending transversely of said vehicle;

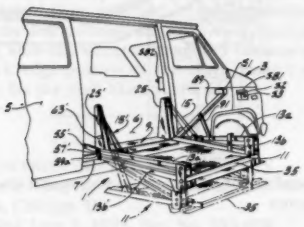
said towing cushion comprising an elongated rigid member secured to said cushion member, said rigid member being below said cushion member and engaging said towing member, said rigid member in cross section having a

horizontal web and a pair of upstanding legs which form a U-shape, said rigid member having handles secured to its opposite ends.

4,010,859
LIFTING IMPLEMENT

Richard K. Ronian, Rte. No. 1, Box 313, Hazelwood, Mo. 63042, and Robert Dale Moses, 3555 Ridgewood Drive, St. Charles, Mo. 63301

Filed May 12, 1975, Ser. No. 576,693
Int. Cl.² B60P 1/48
U.S. Cl. 214—77 R **2 Claims**



1. A lift comprising a base adapted to be secured to the floor of a van-type passenger vehicle adjacent the doorsill thereof, to the bed of a pickup truck adjacent the tail gate thereof, or to other suitable structure, a lifting platform, means for connecting said platform to said base, a pair of cable and pulley means, one for each side of the platform, interconnecting said base and said platform, each of said cable and pulley means including a cable having securement means fixedly attached thereto, and a winch secured to the base having a tapered winding drum for moving the platform via said cable and pulley means in a generally vertical plane between a lowered horizontal position in which the platform is below the level of the base, a raised horizontal position in which the platform is substantially at the level of the base so that a load may readily be moved horizontally on and off the platform, and a stowed position in which the platform is disposed vertically generally above the base, means for converting said winch having a tapered winding drum to a winch which simultaneously winds and unwinds said two cables of said cable and pulley means at substantially the same speed, said winch further including power operated means for rotating said winding drum, said conversion means comprising a sleeve having an outer cylindric surface and an inner tapered bore for reception of said tapered winding drum, said sleeve being split longitudinally to form sleeve halves which are adapted to be placed around the winding drum, means for releasably securing said sleeve halves together surrounding said winding drum, means for securing said sleeve to said winding drum for rotation therewith, and means adjacent each end of said sleeve for securement of a respective cable thereto comprising a recess at each end of one of said sleeve halves for reception of and engagement with said securement means secured to a respective cable, said recesses being so located relative to one another on said one sleeve half for forming a first layer of cable on said cylindric surface as said winding drum is rotated in one direction, said first layer being progressively wound from the ends of the sleeve inwardly toward the center thereof until said cables engage one another, and for further forming a second layer on the first layer, said second layer being progressively wound on said first layer from the center of the sleeve outwardly toward its ends.

2. The method of simultaneously winding first and second cables at substantially the same speed by a single power driven winch having a tapered winding drum comprising the steps of:

securing a sleeve over said tapered winding drum, said sleeve having a tapered inner bore for reception of said tapered winding drum and an outer cylindric surface;

securing one end of said first cable to one end of said sleeve and securing one end of said second cable to the opposite end of said sleeve;

rotating the winding drum in a cable winding direction whereby both cables are simultaneously wound up onto the outer cylindric surface of said sleeve;

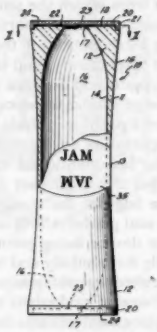
progressively forming a first layer of each of said cables on the outer cylindric surface of the sleeve from the outer ends of sleeve in toward the center of the sleeve as the drum continues to rotate in said cable winding direction, said first and second cables engaging one another substantially at the center of said winding drum; and

continuing to rotate said winding drum in said cable winding direction for progressively forming a second layer of each of said cables over its respective first layer with each of said second layers extending outwardly toward the ends of said winding drum.

4,010,860
SHAPED CONTAINER

Bernard Garber, 6963 N. Bell, No. 108, Chicago, Ill. 60645

Filed Nov. 3, 1975, Ser. No. 628,416
Int. Cl.² B65D 23/00
U.S. Cl. 215—1 R **6 Claims**



1. A generally cylindrical, hollow container having a longitudinal axis and being bilaterally symmetric about a median plane normal to said axis, said container comprising:

a solid circumferential wall forming said container with an outer peripheral surface and a hollow therewithin at an inner peripheral surface thereof,

said wall being radially thicker near opposite longitudinal extremities of said container and radially thinner near said median plane, thereby to form a weighted end for promoting support stability,

said outer peripheral surface being tapered concavely inwardly toward said median plane from said ends, and said inner peripheral surface tapering to reduced cross-section at each of said ends at openings therein,

said wall further having a flat axial surface on each said end about said opening;

engagement means forming a coupling adjacent each said flat surface;

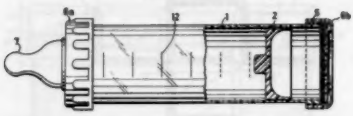
a closure member connected to each respective coupling, each of said closure members having a flat closure surface extending radially across said axial opening forming a support surface by means of which the containers may be positioned uprightly on a support surface; and

sealing means between said wall and said closure member engaging said axial wall and said closure member about said opening to form a liquid-tight seal.

4,010,861
NURSING BOTTLE

Ottar Torolf Welten, Brandshaug, N-2340 Loten, Norway

Filed Oct. 1, 1975, Ser. No. 612,469
Int. Cl.² A61J 9/04
U.S. Cl. 215—11 B 5 Claims

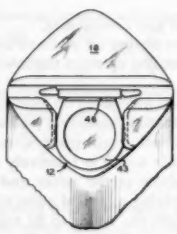


1. A nursing bottle, comprising:
a cylindrical tube having a uniform internal diameter, the opposite ends of said tube having external threads formed thereon;
a suction nipple;
a first cap receivable over said suction nipple, and engageable with the external threads on one end of said cylindrical tube for securing said nipple to said one end;
a piston slidably received within said cylindrical tube, and dividing said tube into a first portion facing toward said one end of said tube and adapted to receive liquid to be dispensed through said suction nipple, and a second portion facing toward the other end of said tube;
a thin foil valve element having a diameter greater than the uniform internal diameter of said cylindrical tube, and engageable with the other end of said cylindrical tube;
a valve plate positioned on the outside of said thin foil valve element, said valve plate and said thin foil valve element having non-aligned flow opening means therein arranged to be closed when said thin foil valve element is in engagement with said valve plate; and
removable means for detachably connecting said valve plate and said thin foil valve element to said other end of said cylindrical tube.

4,010,862
FLUID CONTAINER HAVING SLIDING HANGER ON T-SHAPED SEALING BEAD

Dixie E. Gilbert, Orangeburg, N.Y., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 463,545, April 24, 1974, abandoned. This application Nov. 7, 1974, Ser. No. 521,774
Int. Cl.² B65D 23/00
U.S. Cl. 215—100 A 11 Claims

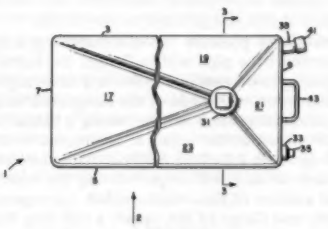


1. A hollow article capable of sitting flat in an upright condition or being suspended in an upside-down condition comprising:
a biaxially oriented container portion having a neck, side walls, and a bottom, which bottom has at least three flat portions spaced around said bottom;
a longitudinal recess passing through a center axis of said article, said recess having a longitudinal T-shaped sealing bead therein comprising a longitudinal cross bar having a boss at each end and a longitudinal stem connecting said cross bar with said bottom wall in said recess, at least one of said flat surfaces being on each side of said longitudinal recess;
said bottom further having a tab receiving recess at right angles to said longitudinal recess, one of said flat surfaces being on each side of said tab receiving recess, said tab receiving recess being so contoured as to form an undercut between said flat surfaces on each side of said tab receiving recess and a portion of said bottom within said tab receiving recess;
and a suspension tab slidably affixed to said T-shaped sealing bead, said tab having downwardly and inwardly projecting members which form a slot, said tab further having a hanger portion having a hole therein and an integral hinge adjacent said downwardly and inwardly projecting members and connecting same with said hanger portion.

4,010,863
COMBINED CONTAINER FOR NEW AND WASTE CRANKCASE OIL

Lawrence G. Ebel, 624 N. Pearl St., Albany, N.Y. 12204

Filed Feb. 9, 1976, Ser. No. 656,380
Int. Cl.² B65D 85/00, 25/40
U.S. Cl. 220—1 C 1 Claim



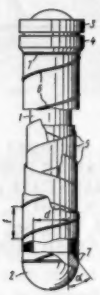
1. A combined double-compartment container and drain funnel for use in changing the crankcase oil for an engine comprising:
a bottom wall;
upstanding end walls and side walls connected to said bottom wall and being relatively short in comparison with the length and width of said bottom wall;
a drain funnel connected to the top of said end walls and side walls;
an internal wall connected to said end walls and side walls in a plane generally parallel to the bottom wall and spaced apart from the bottom wall and from said drain funnel so as to divide said container into a new oil compartment on the bottom and a used oil compartment on the top;
a closable opening in the bottom of said drain funnel communicating with said used oil compartment;
a closable pouring spout formed on an end wall and communicating with the new oil compartment, said spout being adapted for use with the oil filler opening of an engine; and
a closable extension formed on the same end wall in communication with the used oil compartments;
thereby providing a combined double-compartment container and drain funnel having an overall flat and broad configuration enabling it to be placed under an engine having relatively low clearance from the ground.

4,010,864

MULTILAYER PRESSURE VESSEL

Pavel Gdalievich Pimshtein, ulitsa Kurchatova, 9, kv. 45; Marat Moiseevich Shel, ulitsa Kievskaya, 4, kv. 15; Enver Rakhmatullovich Khismatulin, ulitsa 4 Zheleznodoroshnaya, 46"b", kv. 16; Evgeny Grigorievich Borsuk, ulitsa Kurchatova, 5"v", kv. 10; Alexandr Nikolaevich Novikov, ulitsa Kurchatova, 9, kv. 41, all of Irkutsk; Viktor Matveevich Makarov, ulitsa Sakko i Vantsetti, 58, kv. 35; Boris Grigorievich Ziselman, ulitsa Inzhenernaya, 71, kv. 45, both of Sverdlovsk; Alexandr Valeryanovich Kuramzhin, ulitsa Shvernika, 1, korpus 4, kv. 43, Moscow; Viktor Grigorievich Usenko, ulitsa Kurchatova, 9, kv. 28, Irkutsk; Nikolai Kirillovich Globin, ulitsa Griboedova, 20, kv. 64, Sverdlovsk, and Vladimir Viktorovich Ivantsov, ulitsa Kurchatova, 7"a", kv. 31, Irkutsk, all of U.S.S.R.

Filed Apr. 7, 1976, Ser. No. 674,606
Int. Cl.² B65D *7/42*; F16L *9/14*, *9/16*
U.S. Cl. 220—3 **5 Claims**



1. A multilayer pressure vessel comprising a cylindrical portion formed by a pipe with a flange; the bottom of said vessel adjoining said cylindrical portion; a cover adjoining said cylindrical portion at the side of the flange; roll strips wound on said cylindrical portion in layers along a helical line which is counteropposed in the adjacent layers, the winding pitch ranging from 0.2 to 2.2 of the inside diameter of said pipe; the ends of each of said roll strips forming the layers on said cylindrical portion of the vessel welded, correspondingly, to said bottom and flange of the vessel; a roll strip forming the external layer on said cylindrical portion of the vessel, all the coils of said strip being welded to one another on a helical line; roll strips forming the internal layer on said cylindrical portion of the vessel, the intermediate coils of said strips being not welded to one another.

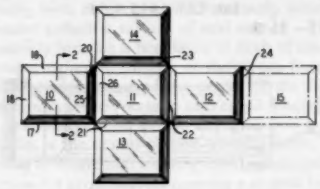
4,010,865

COLLAPSIBLE INSULATED BOX

James L. Wilgus, c/o Reliable Plastics, Inc., 35 Middaugh St., Somerville, N.J. 08876

Filed Nov. 11, 1974, Ser. No. 522,327
Int. Cl.² B65D *7/30*, *5/20*
U.S. Cl. 220—6 **3 Claims**

1. A multi-sided collapsible insulated container comprising a liner composed of a semirigid flexible material segmented into a plurality of contiguous rectangular sections, rigid insulating rectangular panels formed adhering to corresponding sections of said liner by expansion of a rigid urethane foam in a mold having truncated pyramidially-shaped sections corresponding to each of said liner sections, said liner sections combined with said molded urethane foam panels being substantially rigid, each of said molded panels having a truncated pyramid-shaped cellular structure exhibiting a low heat transfer function, adjacent mating side surfaces of each panel being initially molded at an angle of at least 46° with respect to the plane of said liner onto which said panel is formed so as to conform and seal said mating side surfaces by a crushing



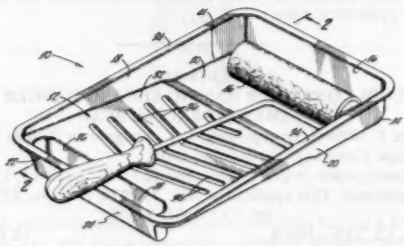
contact of said mating sides when said container is initially formed.

4,010,866

PAINT ROLLER PAN

Robert A. McClane, Anaheim, Calif., assignor to Impact Manufacturing Co., Inc., Santa Fe Springs, Calif.

Continuation of Ser. No. 506,741, Sept. 16, 1974, abandoned. This application June 7, 1976, Ser. No. 693,603
Int. Cl.² B65D *1/36*; B44D *3/12*; B05C *21/00*
U.S. Cl. 220—20 **3 Claims**

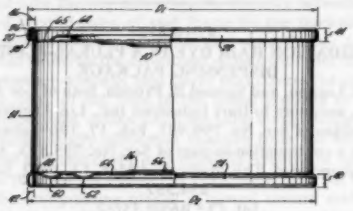


1. A paint roller pan comprising:
a bottom section having an inclined area;
an end wall extending up from the lower end of said bottom section;
a pair of side walls extending up from the respective sides of said bottom section, said end wall and said pair of side walls in conjunction with said bottom section forming a paint receptacle which is relatively deep at one end and relatively shallow at the other end and is of sufficient width for receiving a typical paint roller and of sufficient length to permit the roller to be rolled a substantial distance along the inclined area of the bottom section; and
a leg integrally connected to said bottom section at the shallow end and extending generally parallel to said end wall, said leg maintaining said bottom section inclined relative to the flat support surface on which the pan rests, said leg being hollow with an opening forming a paint brush reservoir for receiving a typical paint brush used to do touch-up work in conjunction with the use of said paint roller, said paint brush reservoir being substantially smaller than said paint roller reservoir, allowing said inclined surface to extend along substantially the entire length of said pan.

4,010,867
TWO-PIECE CAN CONSTRUCTION

Walter C. Jones, San Pedro, Calif., assignor to United Can Company, Fullerton, Calif.

Filed Feb. 4, 1974, Ser. No. 439,345
Int. Cl.² B65D *17/02, 17/08*
U.S. Cl. 220—66 10 Claims

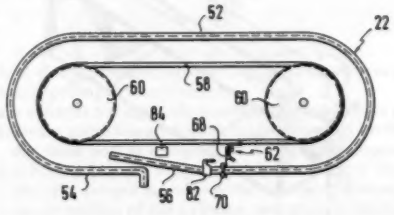


1. A two-piece can comprising:
a first piece having a cylindrical sidewall portion and an integral bottom panel portion;
a plate attached to the end of said cylindrical portion opposite side bottom panel;
a first circumferential lip formed along the attachment of said plate to said cylindrical portion; and
a second circumferential lip formed along the intersection of said bottom panel and said cylindrical portion, said first and second lips having substantially the same cross sectional shape with two separated flat portions joined at one end by a curved portion, at least one of said flat portions on said first and second lips extending away from said plate and said bottom panel respectively in a direction generally parallel to the longitudinal center of said can.

4,010,868
APPARATUS FOR THE AUTOMATIC ISSUANCE AND RETURN OF KEYS

Arkadijus Rese, Gossau, St. Gallen, Switzerland, and Hermann Eberhardt, Syrgenstein, Germany, assignors to Eberhardt & Co., Giengen, Germany

Filed May 12, 1975, Ser. No. 576,895
Claims priority, application Germany, May 27, 1974, 2425487
Int. Cl.² B65H *7/02*
U.S. Cl. 221—9 41 Claims

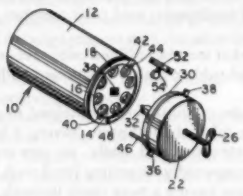


1. A system for storing and dispensing keys comprising, a storage rail having an entry terminal at one end and an exit terminal at the other end and a length sufficient to store a plurality of keys successively therealong, said keys having means for slidably suspending each from said rail, said key having predetermined code means indicative of the nature of the keys to be stored on said storage rail, selection means located at the entry terminal to said storage rail operative to permit only keys having the predetermined code means to be introduced onto said storage, dispensing means located adjacent said rail prior to said exit terminal for engaging at least the leading one of said keys, said dispensing means being actuable to separate the leading key from the succeeding keys causing it to move toward the exit terminal, for separation therefrom.

4,010,869
TIME-DELAYED SINGLE CIGARETTE DISPENSER

Charles Adamo, Middle Village, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Jan. 14, 1976, Ser. No. 649,066
Int. Cl.² A45C *11/00*
U.S. Cl. 221—15 5 Claims

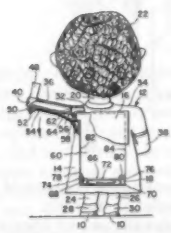


1. A cigarette dispenser comprising:
a cylindrical housing having a dispensing opening,
a cylindrical cigarette magazine slideably and rotatably positioned within said housing, said magazine including
a plurality of cylindrical chambers radially positioned about the periphery of said magazine each adapted to receive a cigarette and to be sequentially aligned with said dispensing opening,
a cover element for said housing, said cover element including
motor means operable for a predetermined time interval,
a rotatable disc connected to said motor means, and
means for operatively connecting said disc to said cigarette magazine when said cover element is attached to said housing,
whereby operation of said motor means for a predetermined time interval will cause said disc to rotate said cigarette magazine to align one of said cigarette chambers with the dispensing opening in said housing to enable a single cigarette to be dispensed from said housing during the interval of operation of said motor means.

4,010,870
TOOTHPASTE DISPENSER AND CONTAINER

Esther Wilson, Apple Creek, Ohio, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Mar. 12, 1975, Ser. No. 557,769
Int. Cl.² B65D *35/30*
U.S. Cl. 222—78 3 Claims



1. A container for dispensing toothpaste, which comprises:
a. a toy figure of a person having a main body with a chamber therein, said main body having a removable rear panel therein, a neck extending upwardly from said body, a head affixed to said neck, a pair of rigid shoulders, a pair of legs with attached feet, said legs extending down-

wardly from said body, a pair of arms with hands, said arms affixed to said rigid shoulders, at least one of said arms of a flexible composition extending horizontally outwardly from said body, and said hand of one said arm having a simulated tube of toothpaste therein, said tube of toothpaste having a neck portion with an externally threaded surface thereon; said tube of toothpaste having an opening therein;

b. a screw cap member threadably engaging said neck portion;

c. a tube member contained in one said flexible arm, said tube member extending from said chamber through said one flexible arm, through said hand into said opening of said tube of toothpaste; said tube member having a hole therein;

d. a rubber gasket member affixed onto said end of said tube member, said rubber gasket positioned within said chamber;

e. a flexible tube of toothpaste contained in said chamber, said flexible tube of toothpaste having a base, a pair of upwardly extending end walls, an upwardly extending rear wall, an upwardly extending front wall, an upper end, and a side arm having a bore there through, said side arm affixed onto one said end wall, a free end of said side arm communicating with said rubber gasket;

f. a suction cup member affixed onto each said foot of said toy figure;

g. a rod member contained in said flexible arm, said rod member affixed to said shoulder, said rod member extending downwardly from said shoulder into said tube through said hole in said tube, said arm flexing downwardly as said tube pulls away from said stationary rod member;

h. a coil spring affixed onto a base of said chamber;

i. a horizontally placed platform affixed onto said coil spring, said platform engaging said base of said flexible tube of toothpaste, each end of said platform having notches therein; and

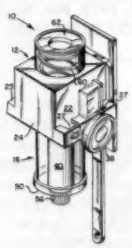
j. a flange member contained on each vertical end wall of said chamber, one said flange member slidably contained in each said notch of said platform for maintaining said platform in a horizontal plane within said chamber.

4,010,871

DEVICE FOR DISPENSING THE CONTENTS OF A COLLAPSIBLE TUBE

Wilson L. Broadie, 842 Victor Ave., Inglewood, Calif. 90302

Filed Dec. 19, 1975, Ser. No. 642,619
Int. Cl.[2] B65D *35/24, 35/34*
U.S. Cl. 222—93 **8 Claims**



1. A device for dispensing the contents of a collapsible tube having a dispensing outlet comprising:

a housing having sidewalls and an integral support frame;

a casing having opposing longitudinal slots extending through the sidewalls thereof and positioned within said support frame and at least partially within said housing, said casing adapted to substantially enclose the collapsible tube and including a spring abutment means at an upper end thereof and a detachable tube mounting means at a lower end thereof;

a shaft extending across the interior of said casing through said casing slots with the opposing end portions thereof mounted for rotation on the housing sidewalls, said shaft including collapsible tube end engagement means; and,

a compression spring means positioned within said casing and extending axially between said spring abutment means and said shaft.

4,010,872

OXIDATION HAIR DYE IN A PLURAL-FLUIDS DISPENSING PACKAGE

David S. Lozano, and Samuel B. Prussin, both of Los Angeles, Calif., assignors to Dart Industries Inc., Los Angeles, Calif.

Continuation of Ser. No. 799,941, Feb. 17, 1969, abandoned, which is a continuation-in-part of Ser. No. 755,823, Aug. 28, 1968, abandoned. This application Mar. 13, 1972, Ser. No. 234,357
Int. Cl.[2] B65D *35/22*
U.S. Cl. 222—94 **1 Claim**

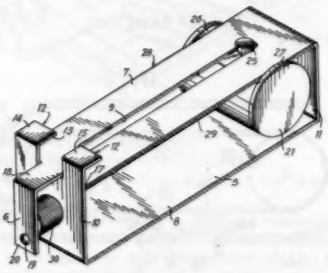
1. A dispensing package having two compartments, one compartment containing one part of a two-part oxidative hair dye composition, the other compartment containing the other part of said composition, and means for mixing said parts including a pressure propellant to dispense said parts together, said one part comprising an aqueous solution containing an alkaline material selected from the group consisting of ammonium hydroxide, and short chain alkanolamines, said other part comprising an aqueous solution having a pH of about 3.75 containing from about 5.95 to about 10.5 percent hydrogen peroxide and about 0.1 percent phosphoric acid by weight, the amount of alkaline material in said first part and the amount of phosphoric acid in said other part being such as to provide a pH of about 8.5 to about 10.0 in the two-part composition immediately after mixing.

4,010,873

TOOTHPASTE DISPENSER

Hovhannes H. Mardirossian, 42-36 81st St., Elmhurst, N.Y. 11373

Filed Aug. 18, 1975, Ser. No. 605,301
Int. Cl.[2] B65D *35/28*
U.S. Cl. 222—101 **7 Claims**



1. A dispenser device for dispensing amorphous material from a tube of amorphous material having a neck, an opening in the neck and an end, said dispenser device comprising

a substantially resilient frame for accommodating a tube of amorphous material said frame comprising a unitary member of substantially resilient material having first and second spaced substantially parallel elongated sides maintained by spring bias at slightly less than parallel relation with each other and having a cover part in operative proximity with a tube of amorphous material accommodated in the frame, said cover part extending substantially perpendicularly from the first side of the frame;

tube compressing means in the frame and guided by said frame for compressing the tube from the end thereof to

the area of the neck thereof, said tube compressing means abutting both the first and second sides of the frame in an initial position and permitting said sides to remain spaced from each other due to said spring bias, and compressing the end of the tube of amorphous material between itself and the second side of the frame when moved toward the area of the neck of said tube to dispense material from said tube thereby extending the distance between the first and second sides of said frame by the thickness of the flattened tube to move the said sides farther from each other whereby the cover part moves with said first side in a manner whereby said cover part covers the opening of the neck of the tube in the initial position of the tube compressing means when the tube compressing means is a substantially maximum distance from the neck of the tube and said cover part frees the opening of the neck of the tube for the transfer of amorphous material when said tube compressing means is moved toward said neck of said tube and the flattened tube is interposed between the tube compressing means and said second side of said frame.

4,010,874

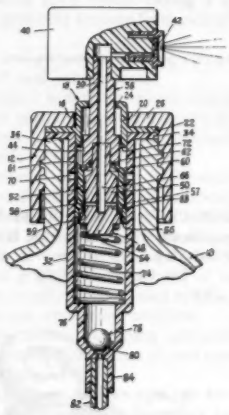
PUMP FOR HAND-HELD DISPENSERS

Wolf Steiman, 649 Springer Road, Fairfield, Conn. 06430

Filed June 26, 1975, Ser. No. 590,688

Int. Cl.² G01F *11/04*

U.S. Cl. 222—321 **1 Claim**



1. A pump construction for hand-held dispensers and the like, comprising in combination:

a. a cylinder having a side vent opening in its upper portion,

b. means providing an annular sealing shoulder on the cylinder inner wall at a location above said vent opening,

c. a hollow plunger reciprocatively mounted at the top of the cylinder and movable in the direction of its axis in the upper portion of the cylinder, said plunger having a discharge passage, carrying a valve head at its lower portion, and having a slide bearing surface above the valve head,

d. a hollow tubular piston carried by the plunger and movable in the cylinder between raised and lowered positions, said piston having a cylindrical body portion which is engageable with and slidable longitudinally on the bearing surface of the plunger between high and low positions thereon, and spaced from the walls of the cylinder, said piston having a lower skirt portion engageable with the cylinder walls and provided with a valve seat engageable with the valve head when the piston is in said low position on the plunger, and

e. means providing a fluid passage from the lower valve seat of the piston to the discharge passage of the plunger when the valve seat is disengaged from the valve head,

f. said plunger having an annular valve seat located above its slide bearing surface and engageable with an upper portion of the piston when the latter is in its high position on the plunger,

g. the upper edge portion of the piston body portion constituting a valve which engages the sealing shoulder in the cylinder when the piston is in its raised position in the cylinder,

h. the said upper portion of the piston having an inwardly-extending flange located at the upper piston end and extending toward the plunger axis, said plunger having a body portion disposed under said flange, and having means maintaining it spaced from the flange,

i. the upper surface of said flange constituting a valve face adapted for engagement with the annular valve seat of the plunger,

j. said annular valve seat of the plunger being conical and snugly receiving the piston flange,

k. the upper surface of the piston flange and the said upper edge portion of the piston body portion constituting essentially a single continuous conical surface,

l. the annular sealing shoulder in the cylinder being conical for engagement with said single continuous conical surface of the piston body portion.

4,010,875

POURER-STOPPER

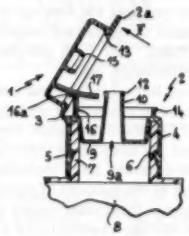
Pierre Babiol, Villefranche-sur-Saone, France, assignor to Le Bouchage Mecanique, Paris, France

Filed Jan. 13, 1976, Ser. No. 648,707

Claims priority, application France, Jan. 16, 1975, 75.02014

Int. Cl.² B67D *3/00*

U.S. Cl. 222—517 **6 Claims**



1. A pourer-stopper comprising a stoppering device adapted for mounting on a container neck, and having a first portion having a discharge spout, a second portion including a cap for shutting off the spout and hinged to the said first portion by a connecting tab, and resilient means acting between said portions and operable to assist movement of said cap from a partially open position to a fully open position and to prevent free return of said cap from said fully open position, said resilient means including a flexible blade integral with one of said stoppering device portions and extending generally axially thereof and including a cooperating tongue integral with the other of said portions and extending generally axially thereof, said blade being adapted to flex in response to engagement with said tongue during opening movement of said cap whereby initially to resist opening and then to straighten resiliently to lever said cap to said fully open position.

4,010,876

ARRANGEMENT FOR THE DELIVERY OF MEASURED QUANTITIES OF THE MOLTEN CONTENTS OF A STORAGE VESSEL

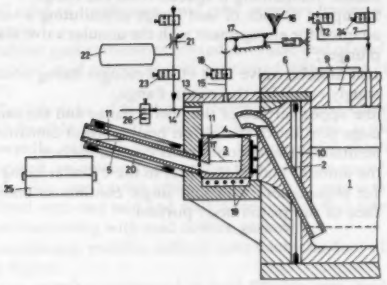
Robert Steinemann, Schaffhausen, Switzerland, assignor to Georg Fischer Aktiengesellschaft, Schaffhausen, Germany

Filed Mar. 25, 1975, Ser. No. 561,687

Claims priority, application Switzerland, Apr. 9, 1974, 4982/74

Int. Cl.² B22D *39/00*

U.S. Cl. 222—595 **3 Claims**



3. An arrangement for the delivery of predetermined amounts of the molten contents of a storage vessel, said arrangement comprising:

a storage vessel having an overflow pipe and a closeable opening to insert a molten charge, said vessel being sealed when said opening is closed;

an intermediate vessel, said vessel being sealed and into which said overflow pipes opens, the end of said overflow pipe within said intermediate vessel being at a higher level than the end within the storage vessel, said intermediate vessel being provided with a rising delivery pipe;

measuring means, provided in said intermediate vessel, for providing an electrical parameter which corresponds to the molten charge within said intermediate vessel;

first gas-pressure lines, said lines having pressure release means, for providing pressurized gas to said storage vessel, said pressurized gas for forcing molten metal from said storage vessel through said overflow pipe into said intermediate vessel, said first gas-pressure lines being individually controllable; and

second gas-pressure lines, said second lines having pressure release means, said pessurized gas for forcing molten metal from said intermediate vessel through said delivery pipe, said second gas lines being individually controllable, said second gas-pressure lines including means for controlling the slope of the amount of metal delivered by said delivery pipe versus time, said means including a closed, pressurized gas storage chamber and a constant-pressure adjustable gas source, said storage chamber and adjustable gas source being combined in a single gas line to provide a high initial gas pressure followed by a lower gas pressure when said single gas line is opened.

4,010,877

WORK FIXTURE AND FOLDING METHOD

Robert L. Hayes, and Joseph C. Gould, both of Honea Path, S.C., assignors to Parke, Davis & Company, Detroit, Mich.

Division of Ser. No. 585,271, June 9, 1975. This application Apr. 22, 1976, Ser. No. 679,110

Int. Cl.² A41H *33/00*

U.S. Cl. 223—37 **4 Claims**

1. Method of folding an article of wearing apparel comprising:

mounting one end of the article on the cuff of a hollow sleeve fixture so that the article is suspended by gravity from the fixture,

grasping the article at a point between said end and its lower end,

raising the article and inserting it into the sleeve fixture for

a distance at least sufficient to cause said mounted or trailing end of the article to be demounted from the cuff, and withdrawing the article from the sleeve fixture under gravity thereby accomplishing simultaneous removal of the article from the fixture and folding of the article on a fold line coinciding with the point of grasping.

4,010,878

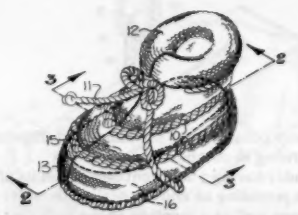
DISPLAY FORM FOR BABY BOOTIE

Twain Westmoreland, Rte. 2, Box 168, Hillsville, Va. 24343

Filed May 3, 1976, Ser. No. 682,446

Int. Cl.² D06C *5/00*

U.S. Cl. 223—75 **5 Claims**



1. The combination of a display form and a baby bootie including a foot and ankle portion, said display form including an integrally formed elongate member having an overall length of only a few inches and a width of a fraction of its length and wherein the length and width generally correspond to the length and width of the foot portion of the baby bootie, said member including an upper wall spaced above the bottom of the bootie and with side walls extending downwardly therefrom on all sides thereof and being connected to the upper wall along a radius so as to provide rounded corners of connection of the side walls to the upper wall for aiding in inserting the display form within the baby bootie, and wherein the height of the side walls is a fraction of the width of said upper wall and wherein the height of the side walls generally corresponds to the height of the foot portion of the bootie so that the ankle portion of the bootie extends upwardly above the display form and the display form is substantially hidden in use.

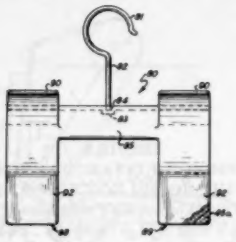
4,010,879
GARMENT HANGER

Paul J. George, P.O. Box 86, Brecksville, Ohio 44141, and M. Ted Raptes, 2111 Jefferson Davis Highway, Arlington, Va. 22202

Continuation-in-part of Ser. No. 401,292, Sept. 27, 1973, Pat. No. 3,923,213. This application Dec. 1, 1975, Ser. No. 636,610

Int. Cl.² A47J 51/94

U.S. Cl. 223—96 **9 Claims**



1. A one-piece hanger fabricated from a plastic material for gripping and hanging a garment permitting it to hang freely comprising gripper means, spring-biased yoke means, gripper separating means, and hanger suspending means:

a. said spring-biasing yoke means having a spring action property and a generally arcuate form extending horizontally;

b. gripper means and gripper separating means disposed at opposite ends of said yoke means;

c. each of said gripper separating means comprising a pair of arm members angled downwardly towards each other, each arm member connected at an intermediate portion thereof to the side of said yoke means;

d. said gripper means comprising horizontally-extending gripper members connected to and coextensive with the lower end of each of said arm members; each of said gripper members having an inwardly disposed vertical gripping surface comprising a planar dimensional area having frictional gripping means; both of said gripping surfaces being normally spring-biased by said yoke means in a parallel, closed, contacting position;

e. said suspending means extending upwardly and connected to an upper medial portion of said yoke means for suspending said hanger;

whereby said gripper means at each end can be easily separated by squeezing respective arm members towards each other to thereby enable a garment to be inserted and frictionally held between said gripper members at each end of said hanger upon release of said arm members.

4,010,880
APPLIANCE FOR THE SECURE TRANSPORT OF DOMESTIC ANIMALS SUCH AS DOGS AND CATS

Maria Guillot-Munoz, 60 rue Mazarine, Paris, France (75006)

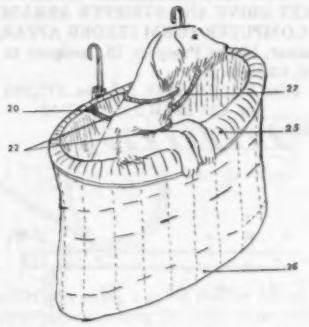
Filed Aug. 4, 1975, Ser. No. 601,285

Claims priority, application France, Aug. 13, 1974, 74.27981

Int. Cl.² B60R 7/00

U.S. Cl. 224—42.42 A **10 Claims**

1. An animal supporting and restraining device for providing the secure transportation of domestic animals such as dogs and cats on a passenger seat comprising a collapsible basket including first and second frame hoops each of closed configuration, a bag-like member consisting of a cover of flexible material fixed over said rigid hoops and having a side portion and a bottom portion, ring means fixedly connected to said upper hoop, strap means connected to said ring means and connectable to an animal carried within the confines of said bag-like member for retaining an animal therein, a medial third hoop, brace means connecting said third hoop to said lower hoop for maintaining said third hoop in spaced parallel relationship above said lower hoop and a plurality of pairs of hinged bars connecting said upper hoop to said third hoop, each pair of hinged bars comprising an upper bar and a lower bar, upper pivot means connecting the upper end of each of



said upper bars to said upper hoop, medial pivot means connecting the lower end of each of said upper bars to the upper end of an associated lower bar and lower pivot means connecting the lower ends of each of said lower bars to said third hoop and movable hook means connected to said upper hoop for permitting the support of said device on the back of an automobile seat or the like.

4,010,881
APPARATUS FOR THE TREATMENT OF CHIPS

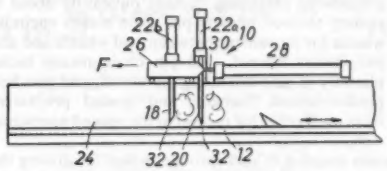
Klaus von Wietersheim, Heiligenhaus, Germany; Bastiaan Maertzdorf, Schaesberg, and Eduard Hendrik Schiks, Heerlen, both of Netherlands, assignors to Mayfran Incorporated, Cleveland, Ohio

Filed Aug. 11, 1975, Ser. No. 603,751

Claims priority, application Germany, Aug. 14, 1974, 2439129

Int. Cl.² B26F 3/02

U.S. Cl. 225—100 **20 Claims**



1. A device for separating bales of metal cutting chips formed on a chip conveyor having a conveying direction comprising:

at least one holding tooth positioned along the conveyor and spaced therefrom and selectively movable toward and away from said conveyor; said holding tooth being adapted to penetrate a bale of chips on said conveyor when moved toward said conveyor;

at least one ripping tooth positioned along said conveyor having a first position adjacent to said holding tooth and movable in said conveying direction; said ripping tooth being selectively movable toward and away from said conveyor; said ripping tooth being adapted to penetrate said bale of chips on said conveyor when moved toward said conveyor;

first drive means associated with said holding tooth and said ripping tooth to move said teeth toward and away from said conveyor and;

second drive means independent of said first drive means for moving said ripping tooth laterally away from said

holding tooth to a second position when said teeth have been moved toward said conveyor whereby portions of said bale of chips may be torn away.

4,010,882

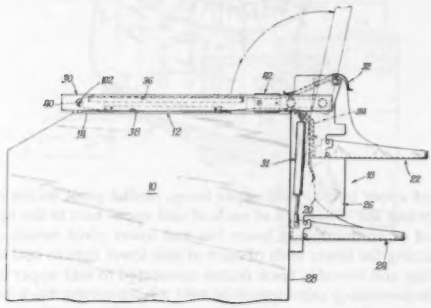
SPROCKET DRIVE AND STRIPPER ARRANGEMENT FOR COMPUTER FORM FEEDER APPARATUS

Carl L. Turner, Mount Prospect, Ill., assignor to A. B. Dick Company, Chicago, Ill.

Filed May 15, 1975, Ser. No. 577,705

Int. Cl.² B65H *25/04, 17/40*

U.S. Cl. 226—11 **6 Claims**



1. In a computer form feed apparatus for feeding a web having predeterminedly spaced apertures along an edge thereof along a copyboard having upper and lower surfaces and a free end, said web moving over said upper surface about the free end of said copyboard and along said lower surface, the upper and lower surfaces of said copyboard being predeterminedly spaced from each other, sprocket drive device means mounted on said copyboard for transporting said web, including in combination;

first and second spaced wheels having diameters less than the distance between said copyboard surfaces and one of which includes a sprocket wheel having a plurality of projections extending radially outwardly about the periphery thereof, endless pin chain means encircling said wheels for movement between said wheels and about the peripheries thereof, said pin chain means including a plurality of pins extending therefrom, said pins being of a predetermined diameter and spaced predeterminedly from each other for receipt in the spaced apertures in said web,

means coupled to said sprocket wheel for driving the latter rotatably thereby to impart movement along said path to said pin chain means, and

stripper means along which said web passes mounted adjacent said pin chain means and including upper and lower central web guide portions extending between said wheels on opposite sides thereof along planes passing generally through the base of said pins as they are moved between said wheels, and upper and lower end guide portions extending from opposite ends of said upper and lower central guide portions, respectively, toward the upper and lower surfaces of said copyboard, respectively, each said end guide portion being inclined from a corresponding central guide portion toward one of a respective upper and lower surface of said copyboard at a relatively shallow angle for lifting the web from said pins as the web is transported from one of said central guide portions to a respective one of said upper and lower copyboard surfaces and to guide said web onto said pins when the web is transported from one of said upper and lower copyboard surfaces to a respective one of said central guide portions, thereby to avoid tearing of said web about said apertures.

4,010,883

THREAD DELIVERY DEVICE FOR TEXTILE MACHINES

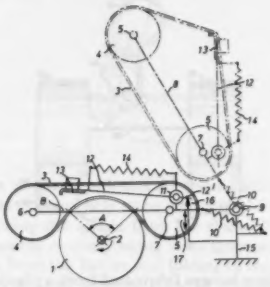
Helmut Ritter, Wattwil, Switzerland, assignor to Herberlein & Co. AG, Wattwil, Switzerland

Filed Oct. 15, 1975, Ser. No. 622,718

Claims priority, application Switzerland, Oct. 30, 1974, 14519/74

Int. Cl.² B65H *51/32*

U.S. Cl. 226—171 **4 Claims**



1. A thread delivery device for a textile machine comprising means providing a first stationary axis, a cylinder mounted coaxially with said axis to be driven thereabout, a pivotable support mounted to swing to and fro about a second stationary axis parallel to said first mentioned axis, spaced rollers mounted for free rotation about spaced parallel axes on said pivotable support, an endless belt embracing said rollers and contacting said cylinder over a predetermined wrap angle when said pivotable support is in an operative position, whereby said cylinder can cause said belt to circulate about said rollers, a pivotally mounted arm, a guide element mounted on said arm to pivot therewith towards and away from a location traversed by said belt when caused to circulate about said rollers, a spring operative on said arm to bias said guide element towards said location, means impeding said guide element from reaching said location when said pivotable support is in said operative position and for freeing said arm to the action of said spring when said pivotable support is moved about said second stationary axis towards an inoperative position wherein said belt is separated from said cylinder, whereupon said guide element engages said belt and removes slack therein.

4,010,884

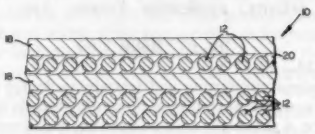
METHOD OF FABRICATING A FILAMENT-REINFORCED COMPOSITE ARTICLE

Edward A. Rothman, South Glastonbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 20, 1974, Ser. No. 525,573

Int. Cl.² B23K *28/00*

U.S. Cl. 228—190 **6 Claims**



1. An improved method of fabricating an impact-resistant filament-reinforced composite article having a plurality of high stiffness, high tensile strength, low density filaments in a lower strength matrix comprising:

positioning a plurality of filament-reinforced foils compris-

ing parallel boron filaments supported on a foil and attached thereto by a fused binder in a multi-ply layup, said foil and said binder consisting essentially of aluminum or alloys thereof;

placing at last one laminate of titanium or an alloy thereof between the filament-reinforced foils; and

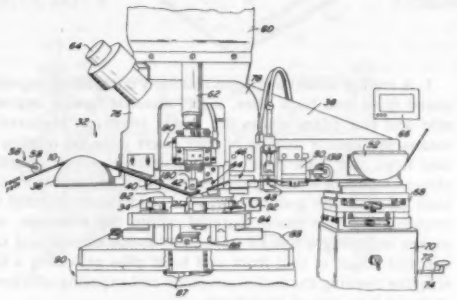
subjecting the multi-ply layup to heat and pressure in a diffusion bonding process to join the titanium and the reinforced foils together in a matrix containing the reinforcing filaments.

4,010,885

APPARATUS FOR ACCURATELY BONDING LEADS TO A SEMI-CONDUCTOR DIE OR THE LIKE

Alan S. Keizer, Huntingdon Valley, and Hugh R. Harris, Levittown, both of Pa., assignors to The Jade Corporation, Huntingdon Valley, Pa.

Filed Sept. 30, 1974, Ser. No. 510,207
Int. Cl.² H01L *21/601*
U.S. Cl. 228—6 A **7 Claims**



1. Apparatus for bonding leads of a lead frame on a film carrier to a die of the type having a plurality of bonding pads, comprising:

means for positioning a die having a plurality of bonding pads adjacent a planar bonding site;

a film carrier track for guiding a film carrier having at least one lead frame thereon to a position adjacent the planar bonding sites;

means for adjusting said film carrier track to align a lead frame on the film carrier with the die bonding pads adjacent the bonding site;

a bonding tool disposed above the film carrier track;

slide means for automatically moving said bonding tool rectilinearly in a plane substantially parallel to the bonding site from a first rest position at which said bonding tool is spaced apart from a line of view substantially perpendicular to the bonding site to a second position at which said bonding tool is coincident with the line of view, said line of view being unobstructed when said bonding tool is at said first rest position;

means for moving said bonding tool rectilinearly along the line of view from the second position to a third position at which said bonding tool is in operative contact with the lead frame and die adjacent the bonding site; and

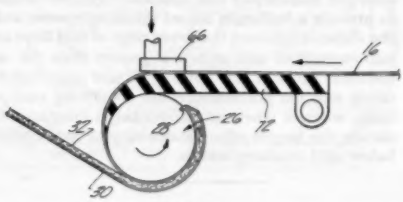
means operatively associated with said slide means for inhibiting movement of said bonding tool towards the bonding site until the bonding tool is coincident with the line of view and for permitting uninhibited movement of said bonding tool when it is coincident with the line of view.

4,010,886

MEANS AND METHODS FOR MAKING A SPIRAL MUFFLER

Gerard R. Santos, Levittown, Pa., assignor to The Budd Company, Troy, Mich.

Filed June 23, 1975, Ser. No. 589,274
Int. Cl.² B23K *31/00*; F01N *7/18*
U.S. Cl. 228—173 **8 Claims**



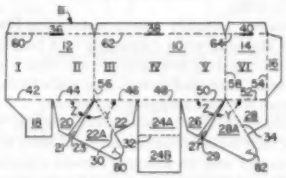
5. A method of making a spiral muffler having sound absorbing properties comprising the steps of providing a rotatable mandrel and motor means for driving said mandrel, securing together a solid metal strip, sound absorbing material and a perforated screen to provide a composite strip, with said sound absorbing material being disposed between said solid metal strip and said perforated screen, placing a pair of end plates on said mandrel, attaching one end of said composite strip on to said mandrel between said pair of end plates, rotating said mandrel to spirally wind said composite strip, welding the longitudinal edges of said solid metal strip to said pair of end plates as said mandrel is rotated, maintaining a fixed space between adjacent sections of said composite strip as said composite strip is being wound, and varying the speed of rotation of said mandrel to provide a relatively uniform welding operation as said composite strip is wound outwardly away from the axis of said mandrel.

4,010,887

CARTON FOR EGG-SHAPED CONTAINERS

David M. Durham, P.O. Box 408, Mebane, N.C. 27302

Filed Apr. 30, 1975, Ser. No. 573,572
Int. Cl.² B65D *85/20*, *3/04*, *5/36*
U.S. Cl. 229—21 **1 Claim**



1. A collapsible base carton for egg-shaped containers of the type having a circular transverse cross-section, wherein the diameter of said cross-section varies from top to bottom, with the largest effective diameter being slightly nearer the bottom than the top and formed by a plurality of radially extending projections, wherein said base carton comprises:

a. a die-cut, pre-folded pre-glued blank means having a first, flattened or knocked down position and a second, unfolded or open position for receiving said containers;

b. said blank means including a front wall, rear wall, and a pre-formed, pre-glued bottom wall means;

c. said bottom wall means being so connected to the lower edge of said front and rear walls, that when said blank is in said first, flat position, said pre-formed bottom wall means is folded up in between said front and rear walls, and when said blank is opened to said second position,

said bottom wall means is resultingly moved to an extended position forming a double thickness, bottom wall without the necessity of any further securing means;

d. each of said front and rear walls including a retaining means along the top edge thereof, said retaining means comprising at least one downwardly and inwardly foldable flap, and upon folding, the lower free edge of said flap is initially spaced from the corresponding front or rear wall defining a diameter less than the said largest effective diameter of said container with the projections to provide a resiliently biased retaining means; and

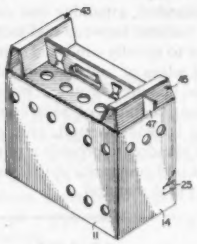
e. the distance between the lower edge of said flaps and the bottom wall of said carton is greater than the vertical distance between the bottom of said egg-shaped container and the horizontal plane containing said projections, wherein when said container is emplaced in said carton, the largest effective diameter of said container is below said retaining means.

4,010,888

SMALL ANIMAL CARRYING CASE

Earl F. Gilbert, Farmington Hills, Mich., assignor to Westvaco Corporation, New York, N.Y.

Filed Apr. 5, 1976, Ser. No. 673,920
Int. Cl.² B65D *5/46*
U.S. Cl. 229—52 B **4 Claims**



1. A shipping container for small animals prepared from a single blank of paperboard or the like and having an integral handle and an effective top closure locking means comprising:

a. opposed pairs of main and side walls foldably connected to define a tube;

b. closure panels foldably connected to the lower ends of said main and side walls consisting of a pair of full width panels connected to said main walls and a pair of half width panels connected to said side walls to define a triple wall bottom for said shipping container;

c. closure flaps foldably attached to the upper ends of said main and side walls to define a top closure for said shipping container and an integral handle element, said top closure flaps further comprising a pair of substantially identical first flaps attached to the opposed main walls, each of said first flaps including main portions for covering the top of said shipping container and riser portions for forming the integral handle element of said shipping container wherein each of said riser portions each further contain a pair of matching male and female locking tabs and slots, a matching handhole cut out and handhole flap with locking tabs, a pair of hook-like projections at each end thereof which engage matching slots in said symmetrical second top closure flaps and a pair of slots inboard of said hook-like projections which engage matching slots in the ends of said second symmetrical second top closure flaps, and a pair of symmetrical second flaps attached to the opposed side walls, each of said second flaps including three separate panels that are folded over and engage the riser portions of said first flaps; and,

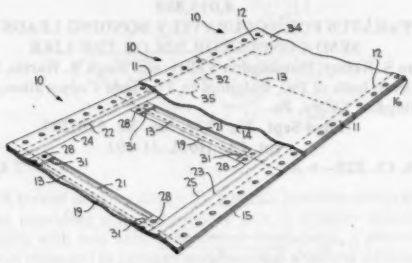
d. means cut from two adjacent main and side walls of said shipping container near the bottom of said shipping container for retaining a feeding/watering receptacle in the finally assembled container, said means further including a removable access panel for said feeding/watering receptable formed in the adjacent walls of said shipping container.

4,010,889

ENVELOPE ASSEMBLY

Robert H. Allen, North Tonawanda; Edmund G. Van Malderghem, Lewiston; Victor J. Robertson, Niagara Falls, and William C. Shook, Wilson, all of N.Y., assignors to Moore Business Forms, Inc., Niagara Falls, N.Y.

Filed Oct. 9, 1975, Ser. No. 621,165
Int. Cl.² B65D *27/10*
U.S. Cl. 229—69 **11 Claims**



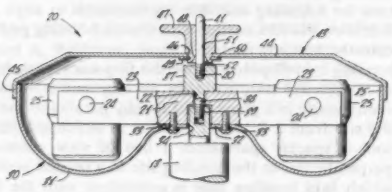
1. A stuffed sealed envelope assembly comprising superimposed front and back plies, insert material having opposite side and end edges within the sealed envelope, registration means preventing shifting of said insert material relative to said front and back plies, said registration means including chip elements in abutting engagement with and unattached to each of said side and end edges of said insert material for immobilizing said insert material within the envelope, and means including a line of weakening inside one of said side and end edges in said front and back plies providing a tear strip for opening the sealed envelope and exposing said insert material for removal therefrom.

4,010,890

CENTRIFUGE ROTOR LID

Herschel Eugene Wright, Santa Clara, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Jan. 28, 1976, Ser. No. 653,278
Int. Cl.² B04B *7/02*
U.S. Cl. 233—1 R **7 Claims**



1. A centrifuge rotor comprising:

a rotatable yoke having an axis of rotation; and

an enclosure for said yoke, said enclosure being operatively connected to said yoke for rotation therewith, said enclosure comprising:

shield means physically connected to the bottom of said yoke and extending beneath said yoke and around the sides thereof, said shield means terminating in an upwardly facing circular lip;

a pin connected to and extending from said yoke coaxial with the axis of rotation of said yoke; and

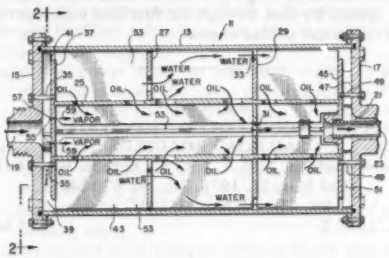
lid means positioned over said yoke and terminating in a downwardly facing circular lip which extends in side-by-side, contacting relationship with said shield means lip, said lid means having a central hole for slidably receiving said pin when said lid is placed over said yoke on said shield means, said lid free to move in a vertical and rotational direction relative to said pin when said lid means lip is in said side-by-side contacting relationship with said shield means lip and when said rotor is stationary, said lid means being free of attachment to said enclosure whereby said lid means can be removed from said enclosure when said rotor is stationary without having to physically disconnect said lid means from said enclosure, said lid means being retained in contact with said shield means during operation of said centrifuge by the force created by the naturally-occurring low pressure within said enclosure, beneath said lid means.

4,010,891

VAPOR REMOVAL APPARATUS FOR OIL/WATER SEPARATOR

Ernest O. Kartinen, Long Beach, Calif., assignor to Burmah Oil & Gas Company, Long Beach, Calif.

Filed Jan. 8, 1976, Ser. No. 647,472
Int. Cl.² B04B *11/02*
U.S. Cl. 233—3 **4 Claims**



1. A centrifugal oil/water separator comprising:
an inlet conduit for supplying a mixture of oil and water to said separator, said mixture including vapor bubbles;
a main, rotating centrifugal separator chamber;
an impeller chamber fluidly connected between said inlet conduit and said main separation chamber;
an impeller mounted within said impeller chamber;
means comprising plural apertures through said separator plate for permitting flow of said vapor bubbles directly from said inlet conduit to said main chamber at a location adjacent the rotational axis of said chamber; and
plural frits mounted in said plural apertures for generating different flow impedances for vapor and liquid flows through said aperture.

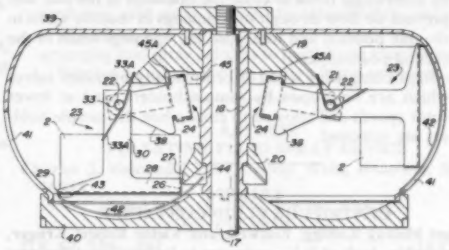
4,010,892

CENTRIFUGE EQUIPMENT AND ANALYTICAL SYSTEM USING IT

Georges Revillet, Onex, and Manuel C. Sanz, Grand-Lancy, both of Switzerland, assignors to Micromedic Systems, Inc., Horsham, Pa.

Filed July 14, 1975, Ser. No. 595,954
Int. Cl.² B04B *9/14*
U.S. Cl. 233—23 A **7 Claims**

1. In equipment comprising a centrifuge for handling and centrifuging liquid material, especially in a carrier or holder for such material, wherein the centrifuge comprises rotor means having an annular axis, a plurality of swing supports on pivotal axes provided in, and spaced equidistantly about, the outer peripheral portion of the annular member, said pivotal axes lying in a common plane each extending at right angles to a radial line from the rotor axis, the improvement wherein the swing has an open-ended tray adapted to receive a carrier for the liquid material to be centrifuged, the open end of the tray being at the outer end of the tray in respect to the rotor axis when the centrifuge is arrested and the swing is in its position



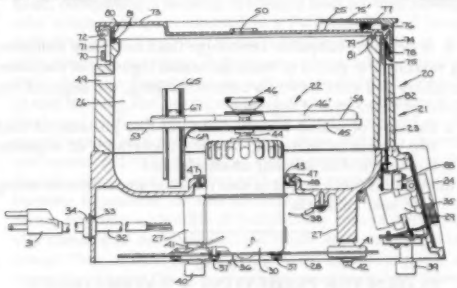
of rest, and where the rotor means and swing supports are enclosed by a concentric cover, said cover being secured to the rotor means for rotation therewith and having openings in alignment with the swing supports through which a carrier may be loaded into or withdrawn from each swing support when the centrifuge is stopped.

4,010,893

TRIAC CENTRIFUGE

John A. Smith, East Orange; Jack H. Miller, Morristown; Russell C. Schilling, Denville, and Howard L. North, Jr., Newfoundland, all of N.J., assignors to Becton, Dickinson and Company, East Rutherford, N.J.

Filed June 20, 1975, Ser. No. 588,713
Int. Cl.² B04B *9/10, 5/02, 7/06*
U.S. Cl. 233—24 **8 Claims**



1. A centrifuge comprising: a stator portion forming a chamber therein and adapted to be positioned on a supporting surface;
a rotor portion rotatably mounted in the chamber of the stator;
variable drive means on the stator and connected to the rotor to rotate the rotor at desired speeds;
sample holding means on the head adapted to hold a number of different types of sample holders;
a cover on the stator adapted to be shifted between the open and closed positions;
control means connected to the drive means to vary the speed of the rotor to correspond with the speed required for centrifuging the samples being held in the sample holding means and for starting and stopping the centrifuge;
the rotor portion including a disc-shaped head of substantially one-piece with appropriate openings and surfaces for receiving the variety of sample holding means thereon;
a cruciform flexible sheet forming four extending flaps being mounted on the underside of the head and being

shiftable between one position when there is no sample holder being employed and a second position when there is a sample holder being employed to reduce windage power losses and to facilitate proper air flow in the centrifuge during operation thereof;

the flaps being located opposite openings in the rotor disc by centrifugal force to close the openings in the disc and prevent air flow through the openings in the disc when in the one position and to expose the openings when in the second position; and

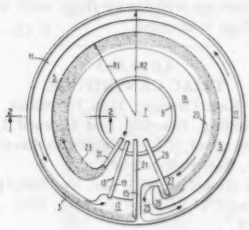
the flaps comprising a set of centrifugally operated valves which are held open by sample holders used at lower rotor speeds and allowed to close when the sample holders are removed.

4,010,894

CENTRIFUGE FLUID CONTAINER

Robert Melroy Kellogg, Endwell, and Victor Robert Kruger, Apalachin, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 21, 1975, Ser. No. 634,209
Int. Cl.² B04B *5/00*
U.S. Cl. 233—27 **10 Claims**



1. A flexible collapsible centrifuge fluid container comprising two circular pieces of material sealed together at the outer periphery and each having a central opening, the edges of the openings being sealed together,

a plurality of sealed-together annular-like portions of said two pieces of material, forming a plurality of separate concentric-like annular channels, and

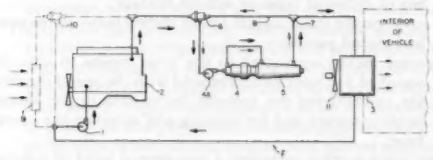
inlet/outlet tubes sealed in said material and communicating with said channels.

4,010,895

SYSTEM FOR PREHEATING A WATER-COOLED VEHICLE ENGINE AND FOR HEATING THE INTERIOR OF THE VEHICLE

Siegfried Kofink; Wolfgang Rich, both of Esslingen, and Herbert Langen, Altbach, all of Germany, assignors to J. Eberspacher, Esslingen (Neckar), Germany

Filed Nov. 20, 1974, Ser. No. 525,576
Int. Cl.² B60H *1/02*
U.S. Cl. 237—12.3 C **7 Claims**



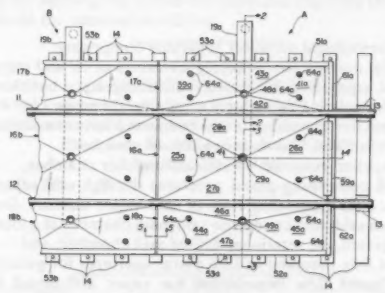
1. A system, for use in a vehicle propelled by a water cooled engine, for cooling the water cooled engine and for heating the interior of the vehicle, comprising a closed conduit system for circulating a cooling liquid, said water-cooled engine having an inlet and an outlet each connected to said conduit system so that the cooling liquid can flow through said engine, a first heat exchanger having an inlet and an outlet each connected to said conduit system for flow of the cooling liquid therethrough and said first heat exchanger arranged to transfer heat from the cooling liquid flowing in the cooling system so that the heat can be used subsequently in heating the interior of a vehicle, a thermostat positioned in said conduit system between the outlet from said engine and the inlet into said first heat exchanger with said thermostat arranged for selectively blocking flow through said conduit system, a T-shaped piece connected to said conduit system between said thermostat and the inlet to said first heat exchanger, said thermostat arranged for selectively blocking flow through said conduit system, a heating device including a second heat exchanger, a first branch conduit extending between said thermostat and said heating device and a second branch conduit extending between said second heat exchanger and said T-shaped piece with said thermostat and said T-shaped piece arranged to form a branch conduit including the first branch connection, the heating device including the second heat exchanger, the second branch connection, the portion of said conduit system extending between said thermostat and said T-shaped piece, with said thermostat and T-shaped piece arranged to direct flow through branch conduit separate from the remainder of said conduit system containing said engine and said first heat exchanger so that cooling liquid flowing through said branch conduit can be heated until a selected temperature is reached and then by arranging said thermostat and T-shaped piece flow of the heated cooling liquid can be directed through said conduit system for flow through the first heat exchanger and through said water cooled engine.

4,010,896

MODULAR LIQUID COLLECTION SYSTEM FOR RAILROAD ROADBEDS

William N. Stockton, 2706 N. 55th St., Omaha, Nebr. 68104

Filed Mar. 25, 1976, Ser. No. 670,145
Int. Cl.² E01B *1/00*; **E01C** *9/06*
U.S. Cl. 238—2 **23 Claims**



1. A liquid collection system for the roadbed of a railroad which includes a pair of parallel rails supported by longitudinally spaced ties, the system comprising

a. a series of collection modules arranged end-to-end along the roadbed and each of which includes at least one rectangular precast basin which rests on a group of ties and extends alongside at least one of the rails,

b. said basin having an upper, liquid-receiving surface defined by four planar faces which slope downward and direct liquid flow toward a centrally located drain opening,

c. said basin also having internal locking means arranged to engage oppositely directed tie side faces to limit movement of the basin in the direction of the rails,

d. each module also including a precast drain trough located between an adjacent pair of ties beneath said drain open-

ing and extending transversely of the roadbed to a region beyond one end of the ties, and

e. the drain trough having a discharge opening at said region.

4,010,897

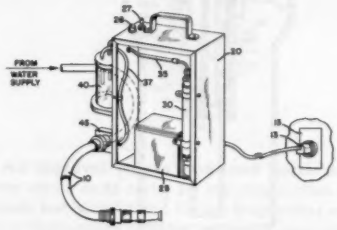
METHOD AND APPARATUS FOR HOME PRODUCTION AND APPLICATION OF NITROGEN FERTILIZER

Richard W. Treharne, Xenia, and Charlton K. McKibben, Dayton, both of Ohio, assignors to Charles F. Kettering Foundation, Dayton, Ohio

Filed Mar. 31, 1976, Ser. No. 672,285

Int. Cl.² B05B *7/30, 17/04;* **C05C** *11/00;* **A01C** *23/04*

U.S. Cl. 239—8 **10 Claims**



5. A method of home production and application of a fixed nitrogen fertilizer solution to the yard or garden of a home comprising the steps of:

applying power from an electrical outlet to electrodes mounted in an arc discharge chamber such that a portion of the oxygen and nitrogen in the air in the chamber is ionized and nitrogen oxides are formed,

transporting the gases in said chamber to a fixture connected between a garden hose and a water faucet and inserting said gases into the water as it flows from the faucet into the hose such that a fixed nitrogen solution is formed, and

spraying said fixed nitrogen solution on the yard or garden with said garden hose.

4,010,898

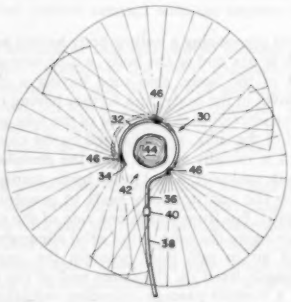
IRRIGATION METHOD AND APPARATUS

David M. Williams, 165 Riker Terrace, Salinas, Calif. 93901

Filed July 21, 1975, Ser. No. 597,327

Int. Cl.² B05B *1/04*

U.S. Cl. 239—11 **14 Claims**



1. A method of distributing a liquid around plant, comprising:

selecting and forming spring conduit means having an open end and a closed semipermanently shaped, into a semicircular spring loop defining a variable throat having a width less than the diameter of said loop,

mounting a plurality of sprinkler heads having a fan shaped spray pattern in the upper wall thereof, said upper wall being defined as the upper surface of the conduit when the loop lies in a substantially horizontal plane;

hooking said loop around the trunk of a plant, connecting said open end of said conduit means to a supply of liquid under pressure;

arranging said spray patterns to extend solely away from said plant; and

arranging said spray patterns to partially overlap for thereby forming an annular spray pattern about said plant.

4,010,899

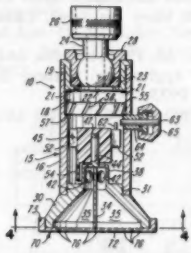
PULSATING FLUID SPRAY DEVICE

Charles J. Heitzman, 1200 College Walk, Honolulu, Hawaii 96817

Filed Nov. 19, 1975, Ser. No. 633,227

Int. Cl.² B05B *1/08*

U.S. Cl. 239—101 **11 Claims**



1. A pulsating fluid spray device adapted for use as a shower head, comprising a housing defining a fluid passage having an inlet adapted to be connected to a fluid supply, said housing including a discharge end portion having a plurality of angularly disposed partitions defining a corresponding plurality of fluid chambers therebetween, a discharge end wall connected to said housing and having means defining a plurality of nozzle discharge orifices for each of said fluid chambers, a cup-shaped stator wall projecting axially from said fluid chambers and connected to said housing, said partitions extending from said discharge end wall into said cup-shaped stator wall and forming extensions of said chambers into said stator wall, means defining a plurality of peripherally spaced ports within said stator wall between said partitions and providing for an inward flow of fluid from said fluid passage directly into said extensions of said fluid chambers and against said partitions, a turbine valve rotor supported for rotation within said fluid passage, said valve rotor including a projecting closure portion having a rotational path surrounding said ports for successively closing said ports and momentarily restricting the inward flow of fluid from said fluid passage into said extensions of fluid chambers in response to rotation of said valve rotor, and means within said housing for directing the fluid along a path to produce rotation of said valve rotor for pulsating the fluid discharged from said orifices.

11. A pulsating fluid spray device adapted for use as a shower head, comprising a housing defining a fluid passage having an inlet adapted to be connected to a fluid supply, said housing including a discharge end portion having a plurality of angularly disposed partitions forming a corresponding plurality of angularly disposed fluid chambers, a discharge end wall connected to said housing and said partitions and defining a plurality of nozzle discharge orifices for each of said fluid chambers, a stator wall connected to said housing and defining a corresponding plurality of angularly disposed ports connecting said fluid chambers directly to said fluid passage, a turbine valve rotor having means defining an axially extending blind bore with an inner end surface, a stationary shaft projecting axially upstream from said stator wall into said bore and en-

gaging said end surface to support said valve rotor for rotation within said fluid passage, said valve rotor including a closure portion having a rotational path adjacent said ports for successively closing said ports and momentarily restricting the flow of fluid from said fluid passage into the corresponding said fluid chambers in response to rotation of said valve rotor, and means within said housing for directing the fluid along a path to produce rotation of said valve rotor to provide for pulsating the fluid discharged from said orifices.

4,010,900

MOBILE AGRICULTURAL SPRAY MACHINE

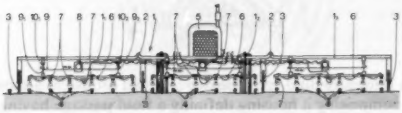
Jean-Marie Flix, 10600 LaChapelle Saint Luc, Mergey, and Guy Payen, 10170 Mery sur Seine, Chauchigny, both of France

Filed Dec. 24, 1975, Ser. No. 644,078

Claims priority, application France, Dec. 31, 1974, 74.43377; Sept. 10, 1975, 75.27678

Int. Cl.² B05B *1/20*; E01H *3/02*; A01B *49/02*

U.S. Cl. 239—168 **13 Claims**



1. In a powder spraying machine for agricultural use, a tractor vehicle having a powder hopper, a frame assembly with wheels including means to affix said powder hopper to said tractor vehicle, said frame assembly having at least two movable sections mounted on wheels; at least two spraying conduits with spray nozzles wherein said conduits are suspended from said assembly moveable sections, motorized adjusting means to permit individual lateral adjustment of each of said conduits, perpendicular to the direction of advance of the tractor vehicle wherein each of said conduits can be individually and laterally moved by said motorized adjusting means during the advance of said tractor and, further adjusting means for adjusting the height and separation of the spray nozzles of each said conduit.

4,010,901

PROJECTABLE LAWN SPRINKLER

Kerney T. Sheets, P.O. Box 637, Duplessis, La. 70728

Filed Mar. 1, 1976, Ser. No. 662,827

Int. Cl.² B05B *15/10*

U.S. Cl. 239—204 **22 Claims**

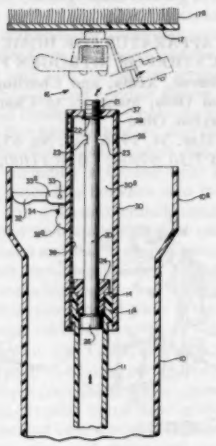
1. A projectable lawn sprinkler comprising:

a. housing means;

b. pipe means rigidly connected to said housing means;

c. projectable conduit means connected to said pipe means;

d. projectable damper means covering a portion of said pipe means, said projectable damper means being rigidly connected to said projectable conduit means; and,



e. means connecteed to said projectable conduit means for spraying water.

4,010,902

BLOW GUNS

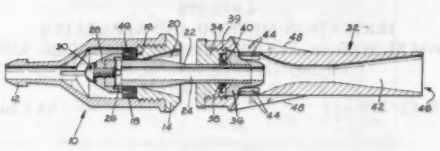
Geoffrey Edward Speyer, Worcester, England, assignor to Taylor & Osborne Limited, Birmingham, England

Filed Nov. 3, 1975. Ser. No. 629,091

Claims priority, application United Kingdom, Oct. 9, 1975, 41459/75

Int. Cl.² B05B *1/28*, *1/30*

U.S. Cl. 239—428.5 **6 Claims**

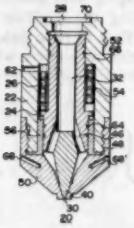


1. A blow gun comprising a hollow body having an inlet for compressed air at one end of the body, a tube extending from the other end of the body, said tube having a closed end mounted to swivel in the body, and further having radial port leading from the interior to the exterior of the tube adjacent to the closed end of the tube, a cap carried by the closed end of the tube which is radially spaced from the periphery of the tube and shrouds said port, a seal in the body, surrounding the tube, on which the cap normally seats to prevent air from entering said port, but from which one side of the cap can be separated by swinging the tube out of axial alignment with the body to admit air to said port, wherein the improvement comprises a nozzle fixed on the outer end of the tube, said nozzle having a Venturi passage extending outward from the tube, the inner end of such passage being radially spaced from the tube and having ports arranged laterally of the tube which act as inlets when air is discharged through the nozzle and as outlets when the nozzle is obstructed, and a plurality of radial vanes on the periphery of the nozzle which extend from the inner ends of the lateral ports substantially beyond the outer ends thereof.

4,010,903
NOZZLE FOR INJECTION MOLDING OF THERMOPLASTICS

Osamu Sakuri; Toshio Saito, and Masanori Kato, all of Tokyo, Japan, assignors to Torazo Saito, Tokyo, Japan

Filed Apr. 21, 1975, Ser. No. 569,928
Claims priority, application Japan, June 27, 1974, 49-72764
Int. Cl.² B05B *1/30*
U.S. Cl. 239—533.1 **11 Claims**



1. An improved plug-in type small nozzle adapted to be inserted into a mold cavity for injecting molten resin of thermoplastic into a cavity and for use in sprueless and runnerless types of multi-cavity molding processes comprising:

a cylindrical body having a cylindrical piston chamber therein open at the forward end and having an inlet at the rear end for introducing molten resin to said piston chamber;

a ring with a flange on the circumference of the front end disposed in said piston chamber, the outer surface of said ring except said flange in contact with the interior surface of the front end of the piston chamber, the rear surface of said flange in contact with the front surface of said cylinder;

a cone shape cylinder cap attached to the front end of said cylinder so that the ring is captured between the front surface of said cylinder and a transverse flat rear surface of said cylinder cap;

a gate at the front end of said cylinder cap opening along the axis of said cylinder for injecting molten resin in said piston chamber into the mold cavity;

a differential moving piston disposed in said piston chamber slidable along the axis of said cylinder for dividing said piston chamber into a front portion and a rear portion, the outer surface of the rear portion of the differential moving piston in axial slidable contact with the interior surface of the rear end of the piston chamber, the outer surface of the front end of the differential moving piston in axial slidable contact with the interior surface of said ring;

a front surface of said differential moving piston defining said front portion of the piston chamber;

a rear surface of said differential moving piston defining said rear portion of the piston chamber, the area of the rear surface being slightly smaller in the effective area functioning as a piston head than that of said front surface;

a needle protruding forward along the axis of said cylinder from said front surface of the differential moving piston, mating with said gate when said differential moving piston is located in the front position of the sliding movement and being apart from said gate when said differential moving piston is located in the rear portion of the sliding movement;

a plurality of annularly spaced passages through said differential moving piston substantially parallel to the axis of said cylinder interconnecting said front portion and said rear portion of the piston chamber for facilitating the application of the same pressure of molten resin on said front surface as on the rear surface to cause backward differential force between the total pressure applied on said front surface and the total pressure applied on said rear surface;

a spring disposed in the piston chamber to apply force to the differential moving piston for holding the differential moving piston in the front position of the sliding movement against said backward differential force until the pressure of molten resin becomes a predetermined value;

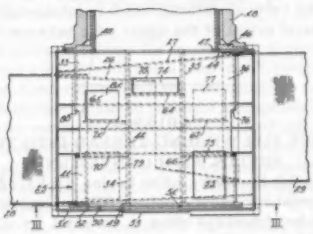
means on the rear end of said cylinder for attaching the cylinder to a molding machine;

the forward end of the cone shaped tip having a configuration adapted to permit direct connection to a mold cavity with the downward end forming part of the inner wall of the mold cavity.

4,010,904
GRINDING MILL TRUNNION DISCHARGER TO OPPOSITE FACING SCREENS

David M. Kjos, Wauwatosa; Raymond C. Jenness, Milwaukee; Richard E. Sabaski, Hales Corners, and Carl A. Roloff, Nashotah, all of Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Apr. 19, 1976, Ser. No. 678,166
Int. Cl.² B02C *23/10*
U.S. Cl. 241—79.3 **7 Claims**



1. In a material discharger for a rotatable grinding mill having a discharger end;

a frame having an axis of rotation carried by the grinding mill for rotation with it;

a plurality of compartments carried by said frame for rotation with the frame and around the axis of rotation of said frame

material inlet openings in one end of each of said compartments adjacent the discharge end of the grinding mill;

a plurality of vibrating screens disposed below said discharger in position to receive material from the discharger; and,

port means in each compartment in position to effect a discharge of material from its associated compartment to said screens as said compartments rotate with said frame about its axis of rotation.

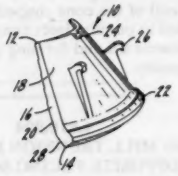
4,010,905
LINER SEGMENT FOR USE IN CONE CRUSHERS AND THE LIKE

Jerome C. Motz, Milwaukee, and Robert J. Pokora, Cudahy, both of Wis., assignors to Rexnord Inc., Milwaukee, Wis.

Filed Mar. 25, 1975, Ser. No. 561,793
Int. Cl.² B02C *2/04*
U.S. Cl. 241—295 **2 Claims**

1. A liner segment for use as a part of a composite liner assembly for lining the bowl in a cone crusher, the segment including a generally upright body portion in the form of a circumferential section of a frustoconical liner, the segment being of limited horizontal peripheral extent with a substantially greater horizontal dimension at the bottom than at the top, the side edges being defined by generally vertical surfaces adapted to oppose like surfaces on adjacent liner segments when mounted in the bowl of a crusher, the body being cir-

cumferentially curvilinear between the generally vertical side edge surfaces defining a somewhat convex outer surface to be positioned against the bowl of the crusher and a somewhat concave inner surface shaped and arranged to define a portion of the crushing cavity in the cone crusher, the segment having a maximum thickness at the bottom and diminishing in thickness toward the top, a peripherally continuous unitary lower bowl-engaging surface adjacent to and limited to the bottom



edge of the segment projecting outwardly from the convex outer surface, and a unitary upper bowl-engaging projection adjacent the upper edge of the segment extending outwardly from the convex outer surface a distance generally equal to the distance of extension of the peripheral continuous lower surface, the upper projection extending a peripheral distance between the vertical surfaces which is substantially less than the peripheral extent of the upper edge between the vertical surface.

4,010,906

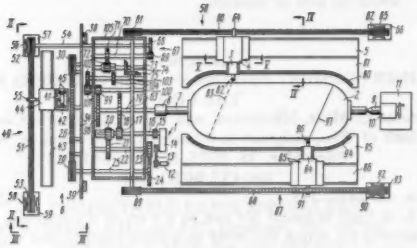
MACHINE FOR WINDING THREAD INTO TUBULAR SHELLS WITH CONVEX ENDS

Igor Vasilievich Kaminsky, ulitsa Lenina, 51, kv. 12, Severodonetsk Voroshilovgradskoi oblasti; Viktor Dmitrievich Protasov, 9 Sokolnicheskaya ulitsa, 4, korpus 2, kv. 32, Moscow; Viktor Alexeevich Pimenov, ulitsa Donetskaya, 35, kv. 57, Severodonetsk Voroshilovgradskoi oblasti; Vyacheslav Alexandrovich Barynin, ulitsa Chernyakhovskogo, 4, kv. 81, Khotkovo Moskovskoi oblasti; Vladimir Vladimirovich Shestakov, ulitsa Lisichanskaya, 41, kv. 30, Severodonetsk Voroshilovgradskoi oblasti; Vladimir Larionovich Polyakov, ulitsa Chernyakhovskogo, 4, kv. 69, Khotkovo Moskovskoi oblasti; Genrikh Fedorovich Severov, ulitsa Pervomaiskaya, 29, kv. 41, Severodonetsk Voroshilovgradskoi oblasti; Aron Iosifovich Zaitsev, ulitsa Donetskaya, 53, kv. 40, Severodonetsk Voroshilovgradskoi oblasti, and Stanislav Vasilievich Stepanov, ulitsa Mayakovskogo, 11b, kv. 58, Severodonetsk Voroshilovgradskoi oblasti, all of U.S.S.R.

Filed May 12, 1975, Ser. No. 576,442

Int. Cl.² B21F *17/00*

U.S. Cl. 242—7.21 **11 Claims**



1. A machine for winding on a mandrel a thread, such as a resin-inpregnated fibreglass thread, to form from the thread a tubular shell with convex ends, comprising:

a mechanism for rotating a mandrel which has a central horizontal axis around its axis;

a first horizontal guide arranged parallel to the axis of said mandrel;

a traverse carriage installed on said horizontal guide for movement therealong;

a thread guide installed on said carriage for movement therewith along said first horizontal guide and for movement with respect thereto in a direction perpendicular to the axis of said mandrel;

an endless flexible linkage connected with said mandrel-rotating mechanism to be driven thereby;

master guides engaging said endless flexible linkage for guiding and setting the position and configuration in space of said endless flexible linkage; the shape of said master guides including a curve which in the rectangular system of coordinates x, y is determined by the relation:

$$y = \int \sqrt{A^2 \left(\frac{d\psi}{dx}\right)^2 - 1}\, dx + C,$$

wherein x is travel of said carriage with said thread guide, an abscissa of a point on said curve determining the shape of the master guides;

$\psi = f(x)$ is the relation between the turning angle ψ of said mandrel and the travel of said carriage with said thread guide;

A is a constant determining the ratio of speed of the endless flexible linkage to the rotation speed of said mandrel;

C is an integration constant assumed to be zero;

y is an ordinate of the point on the curve determining the shape of the master guides;

a vertical guide;

a vertical-guide carriage for transmitting motion to said vertical guide from said endless flexible linkage, said vertical-guide carriage being mounted on said vertical guide for movement therealong and being articulated to said endless flexible linkage;

a second horizontal guide;

a motion-transmitting carriage installed on said second horizontal guide for movement therealong and rigidly connected with said vertical guide, and means linking said motion-transmitting carriage kinematically with said traverse carriage for transmitting movement of said motion-transmitting carriage to said traverse carriage.

4,010,907

APPARATUS FOR AUTOMATICALLY SUPPLYING COPS TO A THREAD WINDER

Shigeyuki Nishiyama; Yoshio Orii, both of Amagasaki; Kotaro Tsurumi, Takatsuki, and Kunio Nishimura, Amagasaki, all of Japan, assignors to Nihon Spindle Seizo Kabushiki Kaisha, Amagasaki, Japan

Filed Aug. 23, 1974, Ser. No. 500,211

Claims priority, application Japan, Aug. 24, 1973, 48-94938

Int. Cl.² B65H *54/20*, *54/26*

U.S. Cl. 242—35.5 A **6 Claims**

1. An apparatus for automatically supplying cops to a winder having plural winding units and a rotary cop magazine for each winding unit for holding a a plurality of supply cops, said apparatus comprising a cop feeder travelling along the winder, said cop feeder including

A. a halting means for stopping said cop feeder in registry with any one of said magazines of the winder;

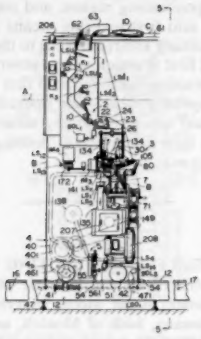
B. a containing unit for storing in a line a number of cops;

C. a feed-out section for successively feeding out cops from said containing unit;

D. a charging section waiting at the cop-receiving position below said feed-out section and receiving and holding cops supplied from said feed-out section, said charing section being movable from a position adjacent said feed-out section to a position adjacent said magazine, means

for shifting said charging section after receipt of cops to the position adjacent said magazine for charging cops to the magazine, said position being close to the cop supply point of the magazine;

E. a yarn end-treating section comprising a yarn take-out means for taking out the end of yarn wound on the cop present in said charging section;



a yarn-gathering means for gathering the yarn spread between said yarn take-out means and the cop charged in the magazine toward a yarn-sucking opening of a yarn clamp of the magazine to catch the yarn by suction and

a yarn-cutting means for cutting said yarn spread between said yarn take-out means and yarn clamp of the magazine.

4,010,908

METHOD AND APPARATUS FOR HANDLING LINEAR ELEMENTS

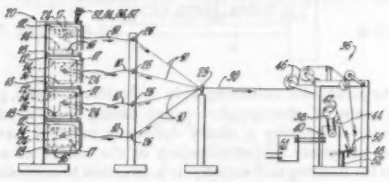
John L. Patterson, Granville, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed July 29, 1974, Ser. No. 492,373

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² B65H *63/00*

U.S. Cl. 242—36 **15 Claims**



1. A method for handling a linear element comprising:

a. linearly advancing a linear element along a given path such that a beam of light directed to the element is reflected therefrom with varying intensity with regard to the speed of advancement of the element;

b. directing a beam of light to the element for reflection therefrom;

c. sensing changes in the intensity of the light reflected from the element as an indication of changes in the speed of its advancement;

d. supplying a signal which varies in response to changes in intensity of the reflected light; and

e. controlling advancement of the linear element in response to the signal.

4,010,909

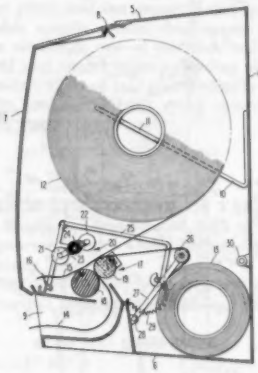
DISPENSING CABINET FOR SHEET MATERIAL

Lehyman John Bastian, Media, Pa., assignor to Scott Paper Company, Philadelphia, Pa.

Filed Sept. 15, 1975, Ser. No. 613,070

Int. Cl.² A47K *10/38, 10/22;* **B65H** *19/04*

U.S. Cl. 242—55.3 **5 Claims**



1. In a dispensing cabinet for sequentially dispensing sheet material from a primary roll and a reserve roll, comprising first and second feed rollers rotatably mounted to form a nip through which sheet material is passed to dispense it from the cabinet, drive means for rotating the first feed roller, transfer means for feeding sheet material from the reserve roll into the nip upon engagement of the transfer means with the feed rollers, and transfer actuation means for causing the transfer means to engage the feed rollers in response to substantial depletion of the sheet material in the primary roll, the improvement wherein:

the transfer means comprises first and second rotatably mounted transfer rollers, each being mounted for movement into engagement with a different feed roller for pressing the reserve roll sheet material into contact with both feed rollers at spaced-apart locations on the sheet material and on the inwardly rotating side of the nip when the transfer rollers engage the feed rollers; and

the feed rollers and the transfer rollers being adapted to drive the reserve roll sheet material towards the nip by the cooperation of the first transfer roller with the first feed roller and being adapted to block the reserve roll sheet material from being driven past the transfer means by the cooperation of the second transfer roller with the second feed roller, whereby the reserve roll sheet material is crowded into the nip upon engagement of the transfer rollers with the feed rollers and rotation of the first feed roll.

4,010,910

FILM SUPPLY AND TAKE-UP SYSTEM FOR MOTION PICTURE PROJECTOR

Angelo Boudouris, Sylvania; William D. Petty, Perrysburg, and Clarence S. Simonds, Sylvania, all of Ohio, assignors to Eprad Incorporated, Toledo, Ohio

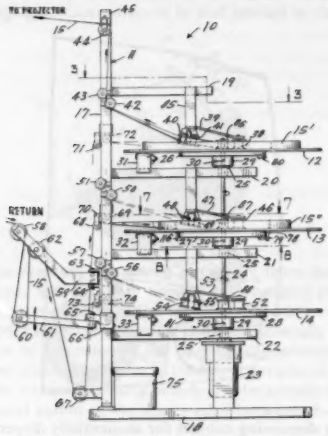
Filed Sept. 29, 1975, Ser. No. 617,520

Int. Cl.² B65H *17/48;* **G03B** *21/00*

U.S. Cl. 242—55.18 **13 Claims**

1. In a motion picture projection system, an improved film transport for supplying film to a projector through which the film is advanced and for taking up film from the projector comprising, in combination, a drive shaft, motor means for rotating said drive shaft at a controlled speed, at least two platter means for carrying coils of film, means for rotationally driving each of said platter means simultaneously from said

drive shaft, one of said platter means functioning as a film take-up platter means for winding a coil of film from the projector and the other of said platter means functioning as film supply platter means for supplying film to the projector, means for controlling the rotational speed of said drive shaft for driving said take-up platter means to wind film at the same



average rate that such film is advanced through the projector, and means for decreasing the rotational speed of said film supplying platter means below the rotational speed of said film take-up platter means for supplying film from a film coil on said film supplying platter means at the same average rate that such film is advanced through the projector.

4,010,911

SPLICING APPARATUS FOR WEBS OF METALLIC FOIL OR THE LIKE

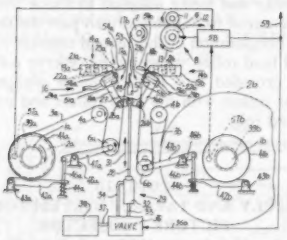
Bob Heitmann, Hamburg, Germany, assignor to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed Nov. 13, 1975, Ser. No. 631,850

Claims priority, application Germany, Dec. 6, 1974, 2457714

Int. Cl.² B65H *19/16*

U.S. Cl. 242—58.4 **11 Claims**



1. Apparatus for attaching a running web which is withdrawn from a first source of supply to the leader of a fresh web which is stored in a second source of supply by means of a uniting band both sides of which are adhesive, comprising means for advancing the running web along a predetermined path; first and second positioning means disposed at the opposite sides of said path, the leader of the fresh web being held by said second positioning means; first and second severing means disposed at the opposite sides of said path and being actuatable to sever the respective webs intermediate the corresponding sources and said advancing means; a splicer having first and second sections actuatable to move toward and away from each other intermediate said positioning means and said sources, said path and the leader of the fresh web being located between said sections; means for holding a uniting band so that the band is located between said sections and between the running and fresh webs; first and second trimming means disposed at the opposite sides of said path and being operable to trim the leaders of webs which are respectively held by said first and second positioning means; and means for actuating said sections and said first severing means whereby said sections attach the running and fresh webs to the opposite sides of the band and said first severing means severs the running web intermediate the uniting band and said first source, said actuating means comprising means for operating said trimming means whereby said second trimming means trims the leader of the fresh web intermediate said holding means and said second positioning means.

4,010,912

APPARATUS FOR COLLECTING WEBS OF PHOTOGRAPHIC PAPER OR THE LIKE

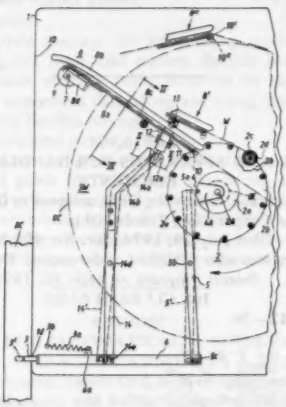
Karl Dreher, Munich; Adolf Fleck, Unterhaching; Christian Götze; Ernst Ismann, both of Munich, and Mathias Pflugbeil, Baldham, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Sept. 24, 1975, Ser. No. 616,418

Claims priority, application Germany, Sept. 26, 1974, 2445998

Int. Cl.² B65H *17/02, 75/28*

U.S. Cl. 242—67.1 R **18 Claims**

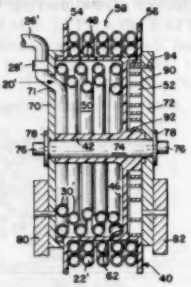


1. Apparatus for collecting webs of flexible material, particularly webs of photographic paper issuing from a copying machine, comprising a rotary collecting member having a slotted periphery for introduction of the leader of a web; means for rotating said member in a direction to convolute the web about said periphery once the leader of such web has entered said member whereby the convolutions of the web form a growing roll surrounding said member; guide means defining an elongated channel through which the web passes on its way toward said member, said guide means being movable between a first position in which said channel extends substantially radially of said member so as to introduce the leader into the interior of said member and a second position in which said channel is substantially tangential to said periphery; means for propelling said guide means from said first to said second position in response to actuation of said rotating means; and intercepting means movable between operative and inoperative positions in which said intercepting means respectively prevents and permits the movement of said guide means from said second to said first position.

4,010,913
RETRIEVER REEL

Rene L. Guerster, Maple Glen, and Leigh David Leiter, Willow Grove, both of Pa., assignors to Ametek, Inc., New York, N.Y.

Continuation of Ser. No. 185,506, Oct. 1, 1971, abandoned. This application Oct. 9, 1973, Ser. No. 404,433
Int. Cl.² B65H 75/48
U.S. Cl. 242—107 8 Claims

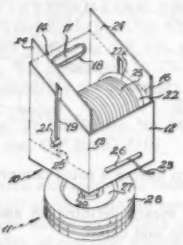


1. A retriever reel comprising a stationary base means, a drum means mounted for rotational movement relative to said base means, a continuous line means having a first portion arranged for unreeling movement from said drum means, a second portion arranged for stationary mounting on the base means and an intermediate portion extending between said first and second portions and arranged in a random-lay spiral coil having a variable diameter and multiple layers extending around the axis of said drum means and remote therefrom to accommodate said relative movement, means attaching said first line portion to said drum means, and means for attaching said second line portion to said base means, said random-lay spiral coil decreasing in coil diameter as the drum means rotates in one direction relative to the base means as the first portion of the line means is unreeled and increasing in coil diameter when the drum means rotates in the other direction relative to the base means to rewind the first portion of the line means onto the drum means.

4,010,914
PRIMER CORD DISPENSER

Leon Kowalski, Box 213, Snow Lake, Manitoba, Canada

Filed May 28, 1975, Ser. No. 581,488
Claims priority, application Canada, June 17, 1974, 202642
Int. Cl.² B65H 49/00
U.S. Cl. 242—129.62 8 Claims

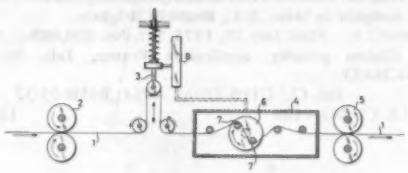


1. A dispenser for explosive primer cord and the like which is wound upon a reel having a transversely extending central bore; comprising in combination a container and a base, means mounting said container upon said base for free rotation in a plane parallel to said base, detachable spindle means in said container to receive the associated reel and to mount same for free rotation upon said spindle and a cord dispensing aperture in one wall of said container, said container including a rear wall, a front wall, a base plate and a pair of side walls forming a substantially cubicle container and at least one selectively detachable spacer plate engaging within said enclosure between one side of the associated reel and one of said side walls of said container, said spacer plate having a substantially vertical slot extending upwardly from the lower edge of said spacer plate and terminating spaced from the upper edge of said spacer plate, said slot engaging said spacer plate over said detachable spindle means, said spacer plate having a configuration similar to one of said side walls but with the upper edge of said spacer plate extending above the upper edge of said side wall when said spacer plate is engaged within said container, said spacer plate being removed by grasping said extending upper edge.

4,010,915
PROCESS FOR THE CONTROL OF YARN TENSION

Hans-Jürgen Strutz, and Ingolf Jacob, both of Bobingen, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 13, 1975, Ser. No. 577,042
Claims priority, application Germany, May 18, 1974, 2424302
Int. Cl.² B65H 59/26
U.S. Cl. 242—147 R 3 Claims



1. A process for the control of the tension of a travelling yarn or thread over a determined distance, which comprises supplying the yarn to travel over the predetermined distance at a substantially constant linear speed, obtention of the yarn tension by using a yarn brake after the above distance working in direction of the travelling yarn and being connected with a yarn tension feeler measuring the yarn tension before the brake, drawing off the yarn from the brake at a substantially constant linear speed, measuring the yarn tension by the yarn tension feeler and, upon rising tension of the yarn in the controlled section, increasing the braking effect of the yarn brake, or upon decreasing tension of the yarn in the controlled section, decreasing the braking effect of the yarn brake.

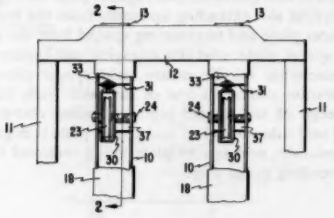
4,010,916
DEVICE FOR PROVIDING PROPER LAYING OF CABLE ON THE DRUM OF A CRANE

Fabian F. Swain, Kingsley, Iowa 51028

Filed Sept. 24, 1975, Ser. No. 616,507
Int. Cl.² B65H 57/28
U.S. Cl. 242—157.1 3 Claims

1. In combination with a hoist including a platform, power-driven drum means rotatably mounted on said platform, a hoist cable attached to said drum means and adapted to be wound onto said drum means, and upright means on said platform through which said cable is adapted to run; means for guiding said cable onto and off from said drum comprising: a cross-threaded axle fixed in said upright means having an axis substantially parallel to that of said drum means and adjacent to said drum means, a sheave wheel rotatably mounted on said axle and laterally movable thereon, said sheave wheel having a part engaged in the threads on said axle so that rotation of the wheel causes a back and forth axial movement across said axle, framework means surrounding said sheave wheel and having parts adjacent the sides of said sheave wheel near said

axle, said framework means including a guide rod extending therefrom, said guide rod being engaged with part of said upright means to guide said framework means, said sheave wheel being engageable with said framework means to that



movement of said wheel is effective to move said framework means, said framework means also including lip means extending therefrom, said lip means extending adjacent to and being slidable along a part of said upright means.

4,010,917

AUTOMATIC STOP DEVICE FOR A MAGNETIC TAPE RECORDING AND/OR PLAYBACK APPARATUS

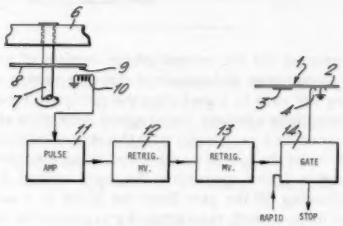
Theophiel Clement Jozef Lodewijk Staar, Kraainem, Belgium, assignor to Staar, S.A., Brussels, Belgium

Filed July 29, 1975, Ser. No. 600,089

Claims priority, application France, July 30, 1974, 74.26453

Int. Cl.² G11B *15/06, 15/54;* **B65H** *25/32*

U.S. Cl. 242—188 **12 Claims**



1. In an automatic stop device for a magnetic tape recording and/or playback apparatus, said apparatus including a drive mechanism for transferring magnetic tape between a supply reel and a take up reel, and an end of tape detector sensitive to reference marks positioned on the magnetic tape near the ends thereof and adapted to stop the tape drive mechanism in response to the passage of said reference marks, the improvement comprising, means for sensing the rotational sped of one of said reels, means for establishing a threshhold speed, and means responsive to the relationship between said sensed speed and said threshhold speed for disabling said end of tape detector at the start of the tape when said take up reel is empty, thereby to prevent premature operation of said stop device.

4,010,918

AUTOMATIC REVERSAL MECHANISM

Saburo Kato, Yokohama, Japan, assignor to Ricoh Co., Ltd., Japan

Filed Nov. 3, 1975, Ser. No. 628,320

Claims priority, application Japan, Nov. 6, 1974, 49-127668

Int. Cl.² G03B *1/04;* **G11B** *15/32*

U.S. Cl. 242—191 **5 Claims**

1. An automatic reversal mechanism comprising:

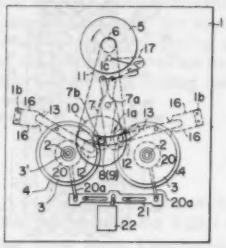
a. a pair of driven wheels,

a drive roller supported for rotation in either direction and movable along a path between said wheels for peripheral engagement with selected one of said wheels,

c. drive source means applying drive to said roller,

d. means for moving said roller beyond a neutral position within said path in either direction in accordance with the direction of rotation of said roller,

e. toggle means pressing said roller against one of said wheels to cause the peripheral engagement therewith upon the actuation of said moving means,



f. a pair of engaging members supported concentrically with, and for relative rotation by a predetermined angle to, respective said wheels, for having exerted load thereon,

g. resilient means connecting said wheels and engaging members, respectively, to cause an amount of relative rotation therebetween in response to the load exerted thereon, and

h. means switching over the direction of rotation of said roller when the amount of such relative rotation reaches a predetermined value.

4,010,919

AUTOGYRO HAVING BLADE TIP JETS

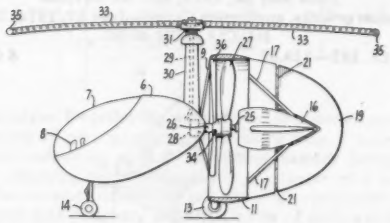
Gerald L. Breuner, 124 Lexford Road, Piedmont, Calif. 94611

Filed Dec. 5, 1975, Ser. No. 637,878

The portion of the term of this patent subsequent to Mar. 11, 1992, has been disclaimed.

Int. Cl.² B64C *27/02*

U.S. Cl. 244—17.21 **4 Claims**



4. An autogyro having a rotor comprising:

a cabin;

duct defining means defining an essentially circular duct connected to said cabin;

an autogyro engine connected to said duct defining means;

a propeller mounted in said duct defining means;

propeller driving means connecting said propeller to said engine and including a first shaft connected at one end to said engine, a bearing block support connected to the other end of said first shaft for supporting said first shaft, a hollow shaft surrounding said first shaft to be essentially coaxial therewith and connected at one end thereof to said first shaft for rotation therewith, and a propeller

mounting means connected to said hollow shaft for rotation therewith so that said propeller is driven by said engine via said shafts and propeller mounting means; and rotor blade tip jets on the rotor for causing rotation thereof so that the rotor is rotated by said tip jets.

4,010,920

APPARATUS AND METHOD TO CONTROL FORWARD CONTROL SURFACE TYPE AIRCRAFT IN FLIGHT

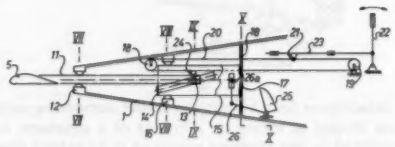
Hans U. Farner, Mythenstrasse 9, Hinwil, Switzerland

Continuation of Ser. No. 289,281, Sept. 15, 1972, abandoned. This application Nov. 19, 1974, Ser. No. 525,120

Claims priority, application Switzerland, Sept. 17, 1971, 13630/71

Int. Cl.² B64C 5/10

U.S. Cl. 244—89 **20 Claims**



5. Aircraft control system to control a heavier-than-air, forward-control airfoil aircraft having a first lifting wing (**4**) to provide lift,

a forward lifting-and-control wing (**5**) located forwardly of the center of gravity (**3**) to provide a controlled lift vector;

said first lifting wing (**4**) being located behind the center of gravity (**3**) of the aircraft (**1**) and providing only part of the lift;

a support means (**6,8,9,11**) supporting said forward lifting-and-control wing (**5**) on the aircraft (**1**);

and means (**7, 7'; 10, 10'; 12, 13**) movably securing said support means (**6,8,9,11**) supporting said forward lifting and control wing (**5**) in the aircraft for movement of said entire forward lifting and control wing (**5**) and the support means (**6,8,9,11**) therefor in a direction parallel to the longitudinal axis of the aircraft to thereby move the entire forward lifting-and-control wing (**5**) and its support means (**6,8,9,11**) longitudinally with respect to the center of gravity (**3**) of the aircraft.

4,010,921

SPACECRAFT CLOSED LOOP THREE-AXIS MOMENTUM UNLOADING SYSTEM

Josef Siegfried Pistiner, Lafayette Hill, Pa., and Ludwig Muhlfelder, Livingston, N.J., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

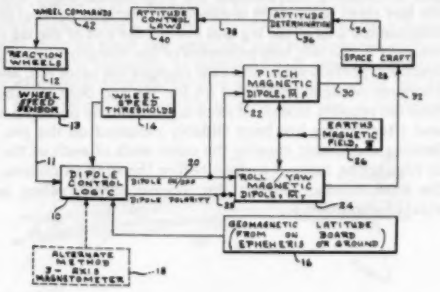
Filed Aug. 20, 1975, Ser. No. 606,273

Int. Cl.² B64G 1/10

U.S. Cl. 244—166 **5 Claims**

1. A closed loop three-axis automatic momentum unloading system for a spacecraft attitude control system comprising:

a spacecraft vehicle havng an attitude control system including, a plurality of reaction wheels and magnetic dipoles; logic processing means; wheel speed sensor means connected to the logic processing means; wheel speed threshold input means connected to the logic processing means; geomagnetic latitude input means connected to the logic processing means; means connecting said magnetic dipoles and the logic processing means whereby excessive momentum in the reaction wheels will cause a signal to be generated in the logic means and sent to the dipoles of such polarity and magnitude as to cause dipole interaction with the earth magnetic field and cause said



attitude control system to react in a manner that will unload momentum stored in said system.

4,010,922

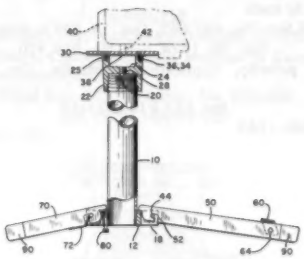
PORTABLE POST SUPPORT

Thomas L. Heller, 12 Wootton Road, Essex Fells, N.J. 07021, and Leonard C. Heller, 40 Oak Lane, Randolph, N.J. 07801

Filed Jan. 2, 1976, Ser. No. 645,943

Int. Cl.² F16M 11/32

U.S. Cl. 248—165 **9 Claims**



1. A post support stand for cartridge rebuilding, reconditioning and like bench-type tool apparatus, this stand having folding legs for selected collapse, storage, transport and the like, said stand having legs which are retained at one end by a common base member, said support stand including: (a) a support column; (b) a base member adapted to engage and retain the lower end of said column in an attitude substantially normal to the plane of the base member; (c) an apparatus tool holder rotatably mounted on the upper end of the support column; (d) means for locking the apparatus tool holder in a selected orientation on the column including a threaded end on the support column with the tool holder carried on this threaded end and a thrust plate positioned between the end of the column and the tool holder, and there is a jam screw carried in a threaded aperture in the tool holder, this jam screw turned into engagement with the thrust plate to cause the tool holder to be locked in the desired orientation on the column; (e) four legs retaining slots having a selected size and orientation formed in the base member; (f) two front legs and two rear legs slidably and pivotally and removably mounted in the retaining slots in the base member and in mounted and extended condition the legs form an X-type configuration, said front legs being the longer pair of legs; (g) a retaining pivot pin carried in each slot and extending at least substantially therethrough, this pin providing a means for pivotally retaining one end of a leg when mounted in the leg retaining slot; (h) a mounting end formed on one end of each leg, this mounting end slidable in an appropriately sized slot in the base

member and in this end is formed a pin engaging slot, this slot sized for an easy sliding fit on the retaining pivot pin, said engaging slot extending inwardly from one longitudinal edge and terminating intermediate the longitudinal edges whereat the slot turns for a short distance substantially parallel to the longitudinal axis of the leg and toward the end of the leg to be retained in the slot, this extension of the slot providing a pivot retention portion when and as it engages the pivot pin, and (i) cooperative means provided on the leg and base member to limit the rotative motion of each leg around the pivot pin when and after the leg has been slidably mounted on the pin, this limiting movement causing the outer ends of each of the legs to engage the support surface before the support column and the base member engage the support surface when in an erected condition.

4,010,923

SUPPORTS FOR CAMERAS

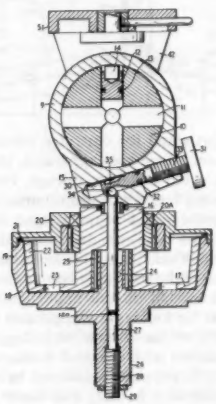
Jeanette Mary Miller, and Robert Eric Miller, both of Rose Bay, Australia, assignors to Timothy Robert Miller and Victoria Alice Miller, both of Rose Bay, Australia, part interest to each

Division of Ser. No. 407,687, Oct. 18, 1973. This application Oct. 30, 1974, Ser. No. 519,370

Claims priority, application Australia, Oct. 25, 1972, 967/72

Int. Cl.² F16M *11/12*

U.S. Cl. 248—183 **9 Claims**



1. A fluid head support for rotating an apparatus supported thereon, said support comprising a casing having a tapered bore therein, a corresponding tapered block, which is rotatable within said tapered bore, means permitting attachment of apparatus to said fluid head support, sealing means to maintain a hydraulic fluid between the corresponding tapered surfaces of the block and casing, means permitting axial movement of the block with respect to the casing, wherein said means permitting axial movement comprises a rod, which is attached to and protrudes from the casing and extends into a coaxial passage within the block, means for axially moving of the rod relative to the block and thereby causing axial displacement of the block with respect to the casing.

4,010,924

ATTACHMENT FOR BRICKWORK

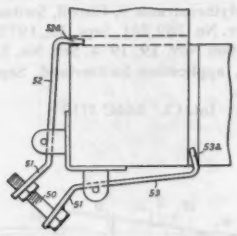
David Charles Parsons; Wendy Anne Parsons, both of Much Hadham; Norman Brian Pigott, Bishops Stortford, and Alan Ernest Foster, Sawbridgeworth, all of England, assignors to S.S.B. (Aerial Fixings) Limited, England

Filed Sept. 4, 1975, Ser. No. 610,288

Claims priority, application United Kingdom, Sept. 9, 1974, 39318/74; June 5, 1975, 24315/75

Int. Cl.² E04H *17/14*; H02B *1/04*; F16M *1/00*

U.S. Cl. 248—225.3 **12 Claims**



1. An attachment for a building structure comprising securing means shaped to locate on a corner of a structure, two arms supported by the securing means so as to extend divergently to permit location of the arms along adjacent faces of the structure to opposite sides of the corner, engagement portions at remote ends of the arms for engagement into a respective one of said adjacent faces of the structure and a single adjustment means operatively coupled with the arms and operable to effect sliding of the arms along said adjacent faces towards the corner to urge said engagement portion into clamping engagement with the structure.

4,010,925

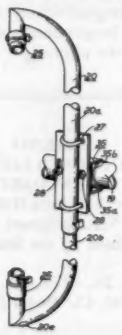
ADJUSTABLE TRAFFIC SIGNAL MOUNTING ASSEMBLY

John S. Garchinsky, Aldan, Pa., assignor to Gar Design Research, Inc., Media, Pa.

Filed Apr. 4, 1975, Ser. No. 565,120

Int. Cl.² A47F *5/00*

U.S. Cl. 248—295 **11 Claims**



1. An assembly for mounting traffic signals or the like comprising:

a. a first rigid, generally J-shaped tubular means having a generally curved end portion permanently and rigidly joined to a straight portion, said curved end portion being adapted to engage one end of said signals,

b. a second rigid, generally J-shaped tubular means having a generally curved end portion for engaging the other end of said signal joined to a straight portion into which the straight portion of said (a) means is adapted to be slid,

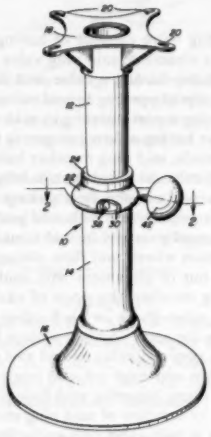
and also having adjustable means disposed transverse thereto which protrudes interiorly thereof a selected distance thereby to engage said (a) means, said adjustable means being constructed to fix the relative position of said (a) and (b) means when assembled together so that a fixed desired distance exists between the curved ends thereof, the terminal parts of said curved ends being arranged to be substantially aligned with one another along an axis substantially parallel to the axis of said straight portions said (b) means having a cross-section which is slightly larger than the cross-section of said (a) means.

4,010,926

ADJUSTABLE PEDESTAL

Garnett H. Carnahan, Box J, Nixa, Mo. 65714

Filed May 26, 1976, Ser. No. 690,097
Int. Cl.² F16M *11/00*
U.S. Cl. 248—411 **10 Claims**



10. In combination with a pair of elongated sections, one of said sections being tubular and telescopingly receiving the other section in one end portion thereof, said one end portion of said other section including means defining an inwardly opening peripherally extending groove segment of at least 90° in angular extent and openings through said one end portion aligned with the ends of said groove segment and provided with outwardly facing seating surfaces, and an elongated tension member of a configuration conforming to and received in said groove and provided with opposite end portions projecting outwardly through said openings, one of said tension member end portions including a first enlargement thereon seated against the corresponding seating surface and the other tension member end portion including a second enlargement thereon shiftable therealong and engageable with the corresponding seating surface for placing said tension member in tension and shifting the tension member into clamping engagement with said other support section.

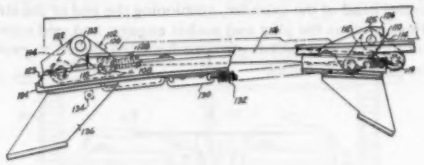
4,010,927

SEAT ADJUSTING MECHANISM

Joseph Pickles, Birmingham, Mich., assignor to Ferro Manufacturing Corporation, Detroit, Mich.

Filed Dec. 3, 1975, Ser. No. 637,160
Int. Cl.² F16M *13/00*
U.S. Cl. 248—420 **3 Claims**

1. An adjustable vehicle seat, comprising stationary rail means adapted to extend generally horizontally of a vehicle, a carriage assembly slidable longitudinally on said rail means, seat elevating means on said carriage assembly including bell cranks pivoted to the front and rear edges of said carriage assembly rotatable about axes adapted to extend transversely of the vehicle, a seat connected to said bell cranks, said bell cranks each having a lift arm extending forwardly and downwardly from its pivot axis when the seat is in lowered position and swingable upwardly to raise said seat, and an actuating arm extending downwardly and rearwardly from its pivotal axis and swingable forwardly to raise said seat, a rigid link



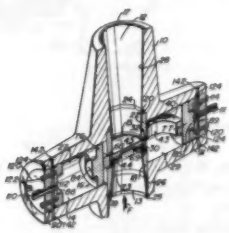
connecting longitudinally aligned actuating arms of said bell cranks, resilient counterbalance means extending generally parallel to said rail means, said counterbalance means comprising a tension spring having its forward end fixed with respect to the vehicle and its rear end attached to the actuating arm of a bell crank at the rear of said carriage assembly to apply simultaneously a forward bias to said carriage assembly and a torque to said bell cranks in a direction to rotate said bell cranks in a direction to elevate said seat.

4,010,928

PISTON-OPERATED PARALLEL-SLIDE GATE VALVE

Russell G. Smith, Cincinnati, Ohio, assignor to Xomox Corporation, Cincinnati, Ohio

Filed Dec. 27, 1974, Ser. No. 536,868
Int. Cl.² F16K *31/122*
U.S. Cl. 251—31 **7 Claims**



1. A gate valve comprising a one-piece valve body having axially aligned inlet, valving and outlet ports, and a pair of axially aligned cylinders normal to a common axis passing through each of said ports, wherein said cylinders are disposed on opposite sides of said valving port; a gate slidably mounted for movement between open and closed positions relative to said valving port; gate actuating pistons in each of said cylinders; means in open communication with each of said cylinders through which pressure media is selectively introduced and/or exhausted incident to movement of the gate to one or the other of its positions; a gate carrier having opposite side edges and a pair of through openings intermediate said edges wherein the said gate is securely though releaseably mounted in one of said openings and wherein the other opening defines a through-port corresponding to the cross-sectional area of the valving port; means securing the opposite side edges of said carrier relative to and between said pistons whereby said carrier is supported and mounted for sliding movement in a plane normal to the said common axis through the inlet, valving and outlet ports; each said piston having an inner face adjacent the valving port and an outer face remote therefrom,

and wherein each cylinder has an inner end in open communication with the valving port and an outer end remote therefrom and defined by a cylinder head; the outer face of each piston and the inner face of each cylinder head having complementary plug and socket portions which are disposed in nested, interengaging relationship as a piston reaches the outer end of its exhaust stroke, a dual inlet-outlet port for pressure media in the said complementary means of each of said cylinder heads; the nested, interengaging relationship of said plug and socket means positively closing off the exhaust of pressure media through the dual inlet-outlet port of the cylinder head of the cylinder, cushioning the end of the stroke of the piston as the plug and socket engage; and said complementary plug and socket portions being hardened to provide wear-resistant surfaces.

4,010,929

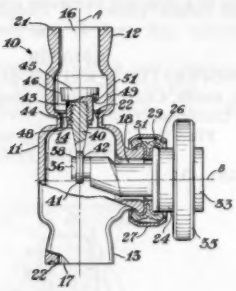
VALVE

James J. Pollock, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 271,375, July 13, 1972, abandoned. This application May 31, 1973, Ser. No. 365,651

Int. Cl.² F16K *31/52*

U.S. Cl. 251—260 **6 Claims**



1. A valve comprising

a hollow body defining

a cavity therein, the body defining at least three openings, three of the openings being

an inlet opening,

a first exit opening and

a valving opening between the inlet opening and the first exit opening,

a seating region within the cavity having a generally circular configuration and

an axis disposed generally perpendicular to the axis of the valving opening,

a crank member rotatably and sealably supported within the valving opening, the crank member having

an exterior end exterior to the cavity and

an interior end in at least close proximity to the seating region, the crank member having

an axis of rotation generally normal to and generally intersecting the axis of the inlet opening, the interior end of the crank member beinc eccentrically disposed relative to the axis of the crank member,

a valving member connected to the interior end of the crank member, the valving member adapted to be selectively positioned in sealing engagement with the seating region by rotation of the crank member, and means to resiliently support the interior end and the valving member within the valve body with the further limitation that the crank member and the valving member are plastic.

4,010,930

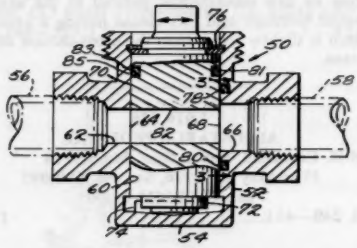
TWO-WAY ROTARY PLUG VALVE

Robert E. Sands, Shelbyville, Ill., assignor to Mueller Co., Decatur, Ill.

Filed Aug. 11, 1975, Ser. No. 603,282

Int. Cl.² F16K *5/04*

U.S. Cl. 251—314 **14 Claims**



1. A rotary plug valve capable of having fluid flow therethrough in either direction, said plug valve comprising:

a housing member having a valve seat therein, a first passage having a port opening to said valve seat and a second passage having a port opening to said valve seat;

a plug member having a flow passgeway therethrough with ports at its ends, said plug member being rotatable on an axis in said valve seat between a fully opened position wherein the ports of the flow passageway therethrough axially align respectively with said port openings of said first and second passages in said housing member and a closed position where said flow passageway in said plug member is out of alignment with said port openings in said housing member, the ports of said flow passageway having the same shape as each other and each of said ports having the same width in a plane bisecting said flow passageway perpendicular to said axis of rotation of said plug member and each of said ports having the same height in a plane bisecting said flow passageway parallel to said axis of rotation of said plug member;

sealing means in said valve seat encircling only one of said port openings of said first and second passages in said housing member when said plug member is in the closed position, said sealing means being defined by an endless groove in said valve seat encircling the one of said port openings of said first and second passages in said housing member and an endless sealing ring positioned in said endless groove; and,

the said passage of said housing member which has said sealing means encircling its port opening having a maximum width parallel to a plane transverse to the axis of rotation of said plug member greater than a maximum width of the other passage parallel to the same plane so that when said plug member is rotated towards the said closed position, the one of said ports of said passageway in said plug member which was cooperating with the port opening of said other passage will have passed beyond the same and be covered by said valve seat prior to the trailing side of the other of said ports of said passageway passing the edge of the port opening of said passage having said sealing means surrounding the same and prior to passing an unsupported portion of said sealing ring.

4,010,931

DOOR LIFTING AND HOLDING TOOL

Lawrence Wheeler, 1500 Clevenger, Modesto, Calif. 95350

Filed Mar. 26, 1976, Ser. No. 670,962

Int. Cl.² B66F *15/00*

U.S. Cl. 254—131 **9 Claims**

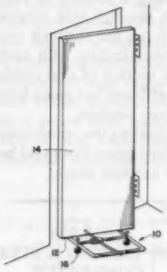
1. A door lifting and holding tool comprising:

a. a hollow frame member for resting on a supporting sur-

face, a portion of said frame member dimensioned for insertion under and for engaging a portion of the lowermost edge of a door resting on said supporting surface;

b. elongated fulcrum means fixedly secured on the ends thereof to said frame member, whose the longitudinal axis of said elongated fulcrum means being substantially parallel to said lowermost edge;

c. a lever element being pivotably affixed to said fulcrum



means and slidable along said longitudinal axis of said elongated fulcrum means, a first end of said lever element dimensioned to engage said lowermost edge of said door, a second end of said lever element for receiving a human foot thereupon;

d. elevation means affixed to said frame member adjacent to said ends of said fulcrum means, said elevation means enabling manual changes in the elevation of said frame member in relation to said supporting surface.

4,010,932

MACHINE FOR MAKING AND KNEADING DOUGH

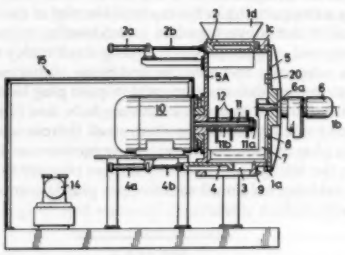
Friedrich Otto, Hameln, Germany, assignor to A. Stephan U. Sohne GmbH & Co., Hameln, Weser, Germany

Filed July 15, 1975, Ser. No. 596,081

Claims priority, application Germany, July 17, 1974, 2434330

Int. Cl.² B01F 7/00

U.S. Cl. 259—6 **21 Claims**



1. In a machine for making and treating dough or similar substances, a combination comprising a receptacle including a substantially horizontal main section having a substantially cylindrical internal surface and two end walls at the respective axial ends of said main section, one of said end walls being movable to and from an open position to respectively afford and prevent access to the interior of said receptacle, an upper portion having a first opening for admission of the ingredients of said substances and a lower portion having a second opening for evacuation of said substances; means for sealing and exposing said openings; first and second tool means mounted in said receptacle for rotation about discrete first and second axes, one of said tool means being mounted on said one end wall and its axis coinciding with the axis of said main section in the closed position of said one end wall; and means for rotating said tool means about the respective axes.

4,010,933

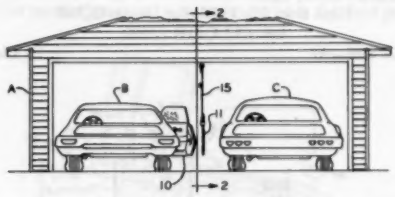
GARAGE WITH IMPROVEMENT TO PROTECT AGAINST DAMAGE TO PARKED CARS

Thomas Hebda, 235 Vance, Lombard, Ill. 60148

Filed Jan. 12, 1976, Ser. No. 648,276

Int. Cl.² A47H 23/00

U.S. Cl. 256—23 **6 Claims**



1. In a garage having a ceiling structure and providing parking space for two or more cars in which two cars are parked in spaced parallel relationship at least one of said cars having a door which opens into the space between cars, the improvement comprising a flexible resilient sheet, and means for suspending said sheet from said ceiling structure in a vertical plane between said cars and spaced from each of said cars, whereby when said door is opened said sheet prevents the door from striking the other of said cars.

4,010,934

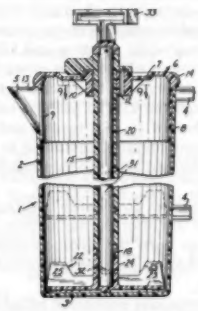
LIQUID MIXING AND DISPENSING DEVICE

King S. McCord, and Irene W. McCord, both of 5617 Code Ave. South, Edina, Minn. 55436

Filed Mar. 17, 1976, Ser. No. 667,967

Int. Cl.² B01F 7/20

U.S. Cl. 259—116 **10 Claims**



1. A liquid mixing and dispensing device comprising:

a. an open-topped, generally cylindrical container;

b. a closure member for the open top of said container;

c. a tubular housing mounted in said closure member and extending axially of said container for rotary and axial movement relative to said container and closure member;

d. a shaft coaxial with said tubular housing and mounted therein for axial movements therewith and for rotation relative to said housing and container, said shaft having opposite upper and lower ends;

e. a disk-like impeller mounted fast on the lower end of said shaft below said housing;

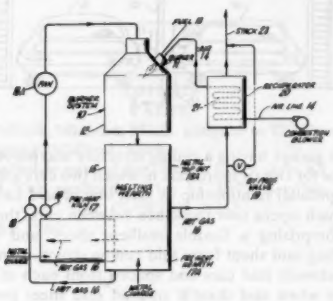
f. handle means on the upper end of said shaft above said housing and closure member;

g. and cooperating stop elements on said closure member and said tubular housing for limiting upward movement of said impeller, shaft and housing, relative to said container and closure member, between the bottom of said container and a plurality of predetermined levels above said bottom of the container.

4,010,935
HIGH EFFICIENCY ALUMINUM SCRAP MELTER AND PROCESS THEREFOR

Wilbur E. Stephens, Redwood City, Calif., assignor to Alumax Inc., San Mateo, Calif.

Filed Dec. 22, 1975, Ser. No. 643,360
Int. Cl.² C21B *11/00*
U.S. Cl. 266—44 **13 Claims**



1. A process for improving the efficiency of melting scrap aluminum in a melting furnace which comprises,

providing a furnace having a melting hearth therein communicating with a combustion chamber having a burner for combusting hydrocarbon fuel and air fed thereto and an after-burner section by means of which said hearth is heated to a temperature to melt aluminum by hot gases formed by combustion and continuously circulated from said after-burner section to said hearth, heating said hearth to an aluminum-melting temperature,

charging scrap containing hydrocarbon contaminants through a rotatable scrap-receiving preheat kiln for preheating said scrap while rotating said kiln,

circulating a portion of effluent hot gases from said hearth through said rotating kiln in countercurrent flow to the scrap fed through the kiln to preheat said scrap prior to the charging thereof to said hearth and to remove said hydrocarbon contaminants contained in said scrap,

charging said preheated scrap to said heated hearth to melt the same,

recycling said hot gases containing hydrocarbons from said rotating kiln to the after-burner section of said combustion chamber to burn the hydrocarbons removed from said scrap and thereby provide additional heat for melting said aluminum,

circulating the remainder portion of effluent hot gases from said hearth to a recuperator cooperatively associated with said combustion chamber to preheat air passing through tubes in said recuperator in heat exchange relationship with said effluent hot gases passing through said recuperator,

conducting said preheated air to the burner of said combustion chamber,

and conducting said effluent hot gases from said recuperator to an exhaust stack,

whereby a marked improvement in thermal efficiency is effected per pound of aluminum melted.

4. An integrated aluminum scrap-melting system comprising in combination,

a hearth for receiving and melting a charge of scrap aluminum,

a combustion chamber having an after-burner section communicating with said hearth,

said combustion chamber having a fuel burner system for burning hydrocarbon fuel with air to produce effluent hot gases in said after-burner section for circulation through said hearth for melting scrap aluminum,

a rotatable scrap-receiving preheat kiln in communication with said hearth for charging aluminum scrap therethrough into said hearth,

means for conducting a portion of said effluent hot gases from said hearth through said rotatable kiln in countercurrent flow to scrap fed through said kiln,

a return duct communicating with said rotatable kiln and said after-burner section of said combustion chamber for conducting said effluent hot gases from said rotatable kiln to said after-burner section,

and means for conducting the remainder of said effluent hot gases as hot exhaust gases from said hearth through a heat exchanger to an exhaust stack.

4,010,936
PROCESS FOR TAPPING A STEEL-MAKING CONVERTER

Masaru Takashima, Tokyo, Japan, assignor to Aikoh Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 476,496, June 5, 1974, abandoned. This application Mar. 15, 1976, Ser. No. 667,009
Claims priority, application Japan, June 5, 1973, 48-62582
Int. Cl.² C21C *5/46*
U.S. Cl. 266—45 **7 Claims**

1. A process for tapping a converter of a steel-making furnace which converter has a tap hole, which comprises (1) placing a stopper plug in the tap hole located at the upper part of a wall of the converter when said converter is in an upright position, said stopper plug comprising a refractory material, a fibrous substance and a binder and being elastic and capable of shrinking and deformation, said stopper plug being larger in diameter than the diameter of the tap hole; and (2) tilting the converter such that the molten steel therein contacts the stopper plug and exerts an increasing pressure on the stopper plug as the tilting proceeds, said stopper plug not being forced out of said tap hole until said stopper plug is completely covered with molten steel.

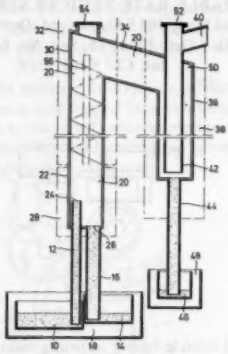
4,010,937
METHOD AND APPARATUS OF REFINING CRUDE CADMIUM

Hans Wilhelm Wieking, and Karl Ehlers, both of Goslar, Germany, assignors to Preussag Aktiengesellschaft Metall, Goslar, Germany

Division of Ser. No. 521,886, Nov. 7, 1974. This application June 4, 1975, Ser. No. 583,558
Claims priority, application Germany, Apr. 13, 1974, 2418170
Int. Cl.² C22B *9/04*
U.S. Cl. 266—149 **11 Claims**

1. An apparatus for continuously refining crude cadmium by a vacuum evaporation process, the apparatus comprising an inverted U-shaped vacuum chamber having a first leg, a

second leg, a transition portion joining said first leg and said second leg, an evaporator and a reflux condenser in said first leg, a feed pipe for feeding said crude cadmium issuing from a crude cadmium bath into said first leg adjacent said evaporator, and a rejection pipe for distillation residue leading from said first leg into a distillation residue bath, said second leg including a further condenser, said feed pipe and said rejection pipe cooperating to prevent back-flow from said rejection pipe to said feed pipe, said transition portion operatively connecting said reflux condenser to said further condenser in said second leg, and an outlet pipe for refined cadmium leading from said second leg to a refined cadmium receiver, whereby liquid crude cadmium introduced by said feed pipe is evaporated in said evaporator and vaporized crude cadmium is passed through said reflux condenser wherein impurities having a higher boiling point than cadmium are condensed together with a portion of pure cadmium vapor, the condensate in said reflux condenser moving in counter-flow with said



crude cadmium vapor, the remaining portion of said pure cadmium vapor being condensed in said further condenser, said feed pipe being immersed in the crude cadmium bath, said outlet pipe being immersed in the refined cadmium receiver, and said rejection pipe being immersed in the distillation residue bath, and having their open ends, which extend into said vacuum chamber at a height above the surface of the levels of said respective baths which corresponds at least to the barometric height of the levels of said baths at the operating temperatures of said baths, said open end of said feed pipe being higher than said open end of said rejection pipe, and further comprising a vacuum pipe, means on said vacuum pipe for connection to a source of vacuum, said vacuum pipe extending downwards along said second leg of said chamber to a point just above the lowermost point of said further condenser, said vacuum pipe forming condensation surfaces in said further condenser, and said feed pipe, said outlet pipe and said rejection pipe being connected to the lowermost free ends of said two legs of said vacuum chamber.

4,010,938

METAL TREATMENT GUN AND METHOD

Edward W. Crudup, P.O. Box 669, Bryson City, N.C. 28713

Filed Mar. 24, 1975, Ser. No. 561,226
Int. Cl.² C21C 7/00
U.S. Cl. 266—216 **5 Claims**

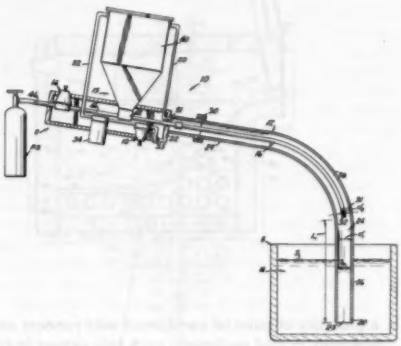
1. A metal treatment gun for selectively introducing particulate metal treating material into a metallic melt below its surface comprising:

a discharge tube defining a discharge chamber therethrough with a first cross-sectional area, the upstream end of said discharge tube being closed and the downstream end of said discharge tube being open so that the metallic melt will be in communication with said discharge member when the downstream end is inserted below the surface of the metallic melt;

an injection tube defining an injection passage therethrough having an outlet end communicating with said first chamber intermediate its ends above the metallic melt;

fluid drive means operatively connected to said injection passage through said injection tube for selectively forcing a fluid propellant through said injection passage under a first pressure so that said fluid propellant is discharged into said discharge chamber toward the downstream end thereof;

feed means for introducing the particulate metal treating material into said fluid propellant flowing through said injection passage in said injection tube for entrainment of the particulate metal treating material in the fluid propel-



lant so that the entrained particulate metal treating material will be discharged into said discharge chamber with said fluid propellant; and,

pressure relief means operatively communicating with said discharge chamber upstream of the outlet end of said injection tube for selectively controlling the pressure in said discharge chamber when its downstream end is in communication with the metallic melt independently of the pressure within said injection passage of said injection tube so that a second pressure is maintained in said first chamber lower than said first pressure in said injection passage by allowing a prescribed portion of said fluid propellant to escape from said first chamber without passing into said metallic melt.

4,010,939

MELTING POT APPARATUS FOR USE IN A CONTINUOUS CASTING PROCESS

Jerome B. Allyn, Graytown; Richard D. Wileman, and John Kozak, both of Toledo, all of Ohio, assignors to Midland-Ross Corporation, Cleveland, Ohio

Filed Dec. 26, 1974, Ser. No. 536,485
Int. Cl.² C22B 7/00
U.S. Cl. 266—242 **2 Claims**

1. Melting pot apparatus containing a liquid metal bath and adapted to be charged with metal hogs, said apparatus comprising:

an enclosure for treating metal in a liquid state defined by a closed steel plate sidewall, said sidewall having a flanged upper end and a lower end, and a bottom plate welded to said lower end of said sidewall;

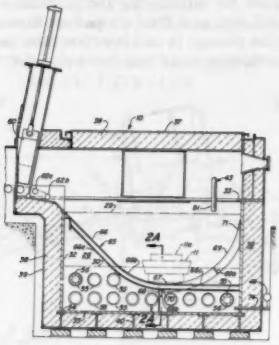
superstructure means secured to said bottom plate to support said enclosure;

vestibule means for charging metal hogs into said enclosure positioned adjacent and above said flanged upper end of said enclosure, said vestibule means including inner and outer charging doors and roller supports for conveying metal hogs through said inner charging door; and

ramp means continuous with said rollers and disposed within the interior of said enclosure for conveying said

hogs down an incline into said bath in a nondestructive manner while supporting said hogs at a fixed elevation within said enclosure during melting thereof, said ramp means including

a. a plurality of transversely-spaced runners extending downwardly into said enclosure to a predetermined point spaced from said bottom plate,



b. a plurality of pairs of curvilinear side runners extending upwardly in said enclosure, each side runner in each pair disposed on opposite leg portions of said runner and each side runner having an upper edge aligned with the base portion of each runner at said predetermined point, and

c. support means extending from said bottom plate to support said runners and said curvilinear runners in a resilient manner at approximately said predetermined point.

4,010,940

TELESCOPIC SHOCK ABSORBER

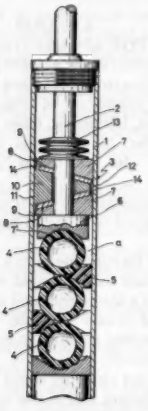
Adalbert Freyler, Tulpenstrasse 17, 56 Wuppertal, Germany

Filed Aug. 5, 1975, Ser. No. 602,101

Claims priority, application Germany, Aug. 14, 1974, 2438978

Int. Cl.² F16F *11/00*

U.S. Cl. 267—9 B **14 Claims**



1. A telescopic shock absorber comprising:

a. a cylindrical tube,

b. a piston rod extending into said tube, said piston rod having a piston thereon received within said tube and comprising: an endpiece secured to the end of said piston rod; a pair of brake discs slidingly received on said rod inwardly of said endpiece and mounted to have no radial movement with respect to said rod, said brake discs having oppositely directed, confronting slanted surfaces thereon; a wedge received between said brake discs and mounted for radial shifting relative to said rod, said wedge having oppositely directed slanting surfaces on the opposite sides thereof extending generally parallel to the confronting slanted surfaces on said brake discs; and resilient means inwardly of said brake discs for urging said brake discs toward said endpiece; and

c. means in the slide path of the rod engageable by said endpiece for producing resistance to sliding movement of the rod, including compressible members having a circular cross-section.

4,010,941

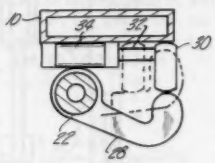
VARIABLE RATE VEHICLE SUSPENSION

Arthur C. Kirkland, 4015 Sturtevant, Detroit, Mich. 48204

Filed Oct. 30, 1975, Ser. No. 627,374

Int. Cl.² F16F *1/14*

U.S. Cl. 267—57 **8 Claims**



1. In a road vehicle having a sprung mass, road wheel means deflectable toward and away from the sprung mass in accordance with terrain irregularities, resilient torsion bar means for suspending the sprung mass from the road wheel means, first means anchoring one end of each torsion bar to the road wheel means, and second means anchoring the other end of each torsion bar to the sprung mass; said first and second anchoring means exerting a wind-up effect on the bar as the road wheel moves from its minimum load condition upwardly toward the sprung mass, and a relaxation effect on the bar as the road wheel moves downwardly away from the sprung mass toward the minimum load condition, whereby the suspension system has a positive spring rate related to the torsional deflection characteristic of the bar: the improvement comprising at least one auxiliary anchoring means stationed between the two previously mentioned anchoring means to anchor an intermediate section of the bar against rotational deflection when the vehicle is in the maximum load condition; each auxiliary anchoring means comprising a thrust absoprtion element operatively engageble with the intermediate section of the bar, and power means for retracting the thrustabsorption element to a position completely disengaged from the bar.

4,010,942

REPAIR SUPPORT ASSEMBLY FOR AUTOMOTIVE TRANSMISSIONS

Gary Lee Ward, 4304 W. 182nd St., Torrance, Calif. 90504

Filed Mar. 4, 1974, Ser. No. 447,688

Int. Cl.² B25B *1/22*

U.S. Cl. 269—15 **3 Claims**

1. A device for removably supporting an automatic, fluid containing, automotive transmission of either the type that has flat opposed side walls or side walls in which transversely aligned cavities are formed, during the time repair work is being performed on said transmission, said device including:

a. a rigid horizontal base that has a plurality of sides;

b. a plurality of spaced casters that depend from said base

and are capable of movably supporting said base above a flat floor surface;

c. an open top fluid receiving receptacle removably supported on said base;

d. a vertical upright that has first and second ends, with said first end rigidly secured to one of said sides of said base;

e. a horizontal tube secured to said second end of said upright, said tube including a transversely positioned outwardly extending boss in which a tapped bore is formed;

f. a threaded rod that engages said tapped bore;

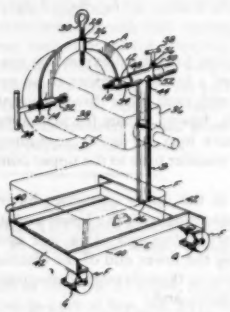
g. a first handle secured to said rod for rotating the latter;

h. a transmission supporting assembly that includes a rigid generally U-shaped member having first and second ends, first means extending inwardly from said first and second ends to removably support one of said transmissions therebetween, said first means including

1. a first externally threaded pin that is secured to said first end of said U-shaped member;

2. a second threaded pin rotatably supported in a tapped bore formed in said second end of said U-shaped member, said second pin transversely aligned with said first pin;

3. A second handle secured to said second pin for rotating the same relative to said tapped bore in which said second pin is supported to move said second pin towards or away from said first pin when said second pin is rotated by said handle in an appropriate direction;



4. first and second bodies having first and second recesses therein that are engaged by said first and second pins;

5. first and second pressure plates pivotally supported on the most adjacently disposed ends of said first and second bodies when the latter are supported from said pins, said first and second pressure plates including first and second corrugated surfaces defined by a material that is of greater hardness than that of the portion of said transmission that said plates will contact, with said pressure plates having said corrugated surfaces thereof forced into frictional supporting contact with the sides of said transmission when said second handle is rotated in an appropriate direction to lessen the distance between said first and second bodies, second means secured to said U-shaped member that may be secured to the hook of a hoist to permit said assembly and a transmission supported thereby to be moved from an automotive vehicle to a position adjacent said device, and a bar extending outwardly from said first end of said U-shaped member, said bar capable of being slidably inserted in said tube and held in a non-rotatable position therein when said first handle is rotated in a direction to move said threaded rod into pressure frictional contact with said bar, when said bar is so engaged supporting said U-shaped member and transmission supported thereby over said receptacle in a first position to permit fluid in said transmission to drain downwardly therefrom by gravity into said receptacle, and said threaded rod when subsequently loosened and again tightened permitting said assembly and transmission supported thereby to be pivoted to and supported in a second position where repair work may be conveniently carried out on said transmission.

4,010,943

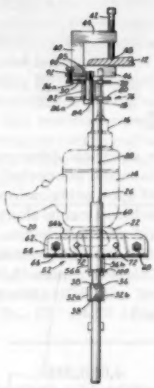
POWER DRILL SUPPORT AND GUIDE APPARATUS

Sheldon E. Eft, 1014 E. Taylor St., Bloomington, Ill. 61701

Filed July 3, 1975, Ser. No. 593,174

Int. Cl.² B23B *45/14*

U.S. Cl. 269—87.1 **15 Claims**



1. Apparatus for supporting a power driven drill in cooperative relation with a workpiece located overhead and for drilling a hole in the overhead workpiece, comprising, in combination, a depending frame means having first and second ends and defining a rectilinear vertically extending guide track, clamping means mounted on the upper end of said depending frame means and adapted to suspend said frame means to the overhead workpiece, a support carriage mounted on the lower end of said frame means and movable upwardly along said rectilinear guide track, said support carriage being adapted to support a power driven drill for movement therewith, drill guide means mounted on the upper end of said frame means generally adjacent said clamping means and the underside of said workpiece and being adapted to receive a drill bit of the power drill therethrough with sliding of said frame means upwardly along said guide track and for guiding said drill bit along its longitudinal axis during a drilling operation, and actuator means supported by said frame means and cooperative with said support carriage to facilitate selective movement of said carriage along said guide track so that a drill supported by said carriage may be caused to drill a hole in said workpiece and thereafter be removed from said workpiece.

4,010,944

BLANK FEEDING DEVICE HAVING AN ADJUSTABLE AND AUTOMATIC POSITIONING BACKSTOP MEANS

Donald Warren Young, Jarrettsville, Md., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed June 16, 1975, Ser. No. 587,288

Int. Cl.² B65H *1/06, 3/08*

U.S. Cl. 271—99 **11 Claims**

1. A remotely operable backstop means selectively positionable along the length of a feed table of a blank feeding device for accommodating different size stacks of blanks thereon, comprising:

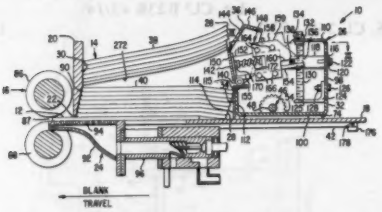
a pair of laterally spaced rack means secured to said feed

table and extending along the length thereof parallel to the direction of feed of said blanks;

an enclosure means extending across and spaced above said rack means transverse to the direction of feed;

a shaft means housed within said enclosure means and rotatably secured to transverse ends of said enclosure means;

a pair of pinion gear means secured to said shaft means, each of said pinion gear means in meshing engagement with one of said rack means; and



a remotely operable electrical drive means housed within said enclosure means and connected to said shaft means for rotation thereof upon energization of said drive means for moving said backstop means along said rack means on said feed table, said enclosure means further including a manually adjustable, pivotably movable, stack support means along the lateral center thereof for resiliently-biased engagement with a bottom blank of an upper portion of said stack.

4,010,945

CONTINUOUS FEEDER

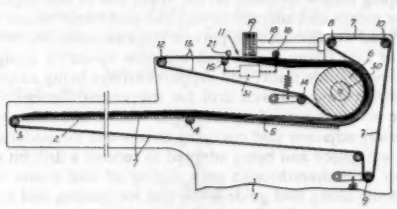
Hermann Kistner, Tamm, Germany, assignor to Maschinenbau Oppenweiler GmbH, Oppenweiler, Germany

Filed Feb. 6, 1976, Ser. No. 656,077

Claims priority, application Germany, Feb. 7, 1975, 2505164; May 16, 1975, 2521849

Int. Cl.² B65H *1/22, 3/10, 7/02*

U.S. Cl. 271—151 **14 Claims**



1. A circular stack sheet feeder comprising a lower loading tray upon which stacks of sheets having a sheet-by-sheet arrangement can be loaded, a conveying and reversing device for transporting the sheets from said loading tray onto a discharge tray in an inverted disposition, said device including a rotatable reversing cylinder having upper and lower sides, means for conveying sheets in a first direction toward the lower side of said cylinder, around said cylinder to the upper side thereof and then in a second direction onto said discharge tray, said means for conveying in said second direction including at least one flexibly stretched conveyer belt which extends over said discharge tray and which is adapted to assume an inclination, at least in the region of said discharge tray, which deviates from the horizontal as a function of the size and weight of the stack of sheets disposed thereon, separating means for drawing off the upper sheet of the stack disposed on said discharge tray, means for automatically adjusting the inclination of said conveyer belt so that the upper sheet of the stack disposed on said discharge tray will always be maintained in substantially horizontal plane thereby facilitating withdrawal by said separating means, first and second rollers extending transversely to said conveyer belt and defining a sheet removal zone therebetween in said discharge tray, said first roller being disposed above said belt and adapted to bear upon the upper sheet in said stack and said second roller being supportingly disposed below said belt, and wherein said means for automatically adjusting the inclination of said conveyer belt includes means for varying the distance between said first and second rollers.

4,010,946

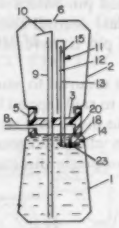
LUNG EXERCISE DEVICE

James Granville Miller, Northwood, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Nov. 24, 1975, Ser. No. 634,111

Int. Cl.² A63B *23/00*

U.S. Cl. 272—99 **7 Claims**



1. In a device for forced expiration exercise wherein liquid is blown from a lower container to an upper container communicating with each other through an interconnecting liquid transfer tube, having means for accommodating the blowing of air pressure into the lower container and forcing liquid through the transfer tube to the upper container, the combination of

a siphon in the upper container having a discharge tube communicating with the lower container,

a downwardly disposed valve seat connected to and surrounding the lower end of the discharge tube and having an aperture therethrough communicating with the discharge tube, and

a flexible coacting dish-shaped valve member located beneath the valve seat in juxtaposed relationship therewith and supported from said valve slot for limited movement toward and away from said valve seat, the outer periphery of said dish-shaped valve member forming a continuous seal surrounding said aperture to limit the upward movement of fluid through said aperture into the discharge tube when blowing pressure is introduced into said lower container and adapted to unseat by the aid of gravity with substantially no back cracking pressure and permit the downward flow of liquid through said aperture when the blowing pressure is relieved and sufficient liquid has been forced into the upper container to prime said siphon, and said dish-shaped valve member adapted to retain liquid when said valve is unseated to be available to seal against the passage of air through said aperture when blowing pressure is commenced and then to form a head of liquid in the lower end of said discharge tube to assist in the priming of said siphon.

4,010,947

VARIABLE WEIGHT EXERCISE MACHINE

Lloyd J. Lambert, Sr., 1538 College Ave., Houston, Tex. 77034

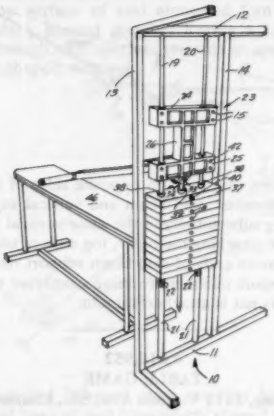
Filed Apr. 18, 1975, Ser. No. 569,206

Int. Cl.² A63B *21/06*

U.S. Cl. 272—118 **6 Claims**

1. An exercise machine comprising a pair of vertical frame

members arranged in spaced parallel relation, a pair of spaced parallel vertical guide members positioned between said frame members, a carriage arranged for vertical reciprocation between said frame members, anti-friction means on said carriage engaging about said guide members for guiding said carriage for vertical reciprocation, said carriage being spaced from said frame members and guided only by said guide members, a plurality of weights mounted for vertical sliding movement on said guide members beneath said carriage and rigid means depending from said carriage for selective connection to said weights for moving the connected weights with said carriage on vertical sliding movement of said carriage, a pair of arms detachably connected to opposite sides of said carriage and a pair of handles secured to said arms for moving said carriage vertically between said frames.



4,010,948

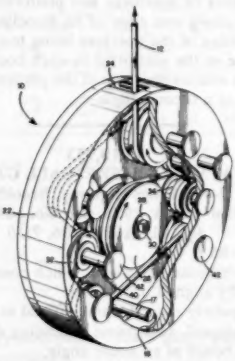
PULL TYPE FRICTION EXERCISING DEVICE

Michael E. Deluty, 37 Addington Road, Brookline, Mass. 02146

Continuation-in-part of Ser. No. 579,704, May 21, 1975, which is a continuation-in-part of Ser. No. 481,907, June 21, 1974, Pat. No. 3,885,789. This application Sept. 18, 1975, Ser. No. 614,610

Int. Cl.² A63B *21/00*

U.S. Cl. 272—133 **8 Claims**



1. An exercising device comprising:

a. a housing having a hollow interior and a cord opening:

b. a cord retractor reel mounted for rotation within said housing;

c. rewind means for continuously urging said retractor reel in the rewind direction;

d. a plurality of capstans all mounted in fixed locations within said housing, the axis of each said capstan being spaced from the axis of said cord retractor reel and from the other said capstans, said capstans all freewheeling in the rewind direction;

e. manually operated locking means associated with said plurality of capstans for selectively locking one or more of said capstans against rotation in the unwind direction in the operating mode, and for selectively unlocking one or more of said capstans to permit freewheeling in the unwind direction in the inoperative mode;

f. a flexible cord fixed to and wrapped around said retractor reel, said cord running from said reel sequentially to and being wrapped at least partially around each said capstan, said cord running from the sequentially last of said capstans out of said housing through said cord opening; and

g. said rewind means and said locked capstans cooperating to apply a retarding force to said cord to oppose an exteriorly applied manual force pulling said cord in the unwind direction, and said rewind means applying a rotational force on said retractor reel to pull said cord in the rewind direction in the absence of an exteriorly applied manual force on said cord.

4,010,949

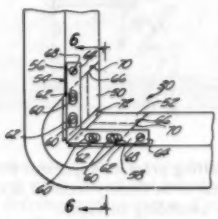
PLUGS FOR POCKET BILLIARD TABLES

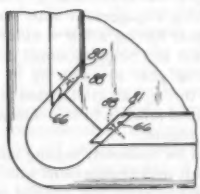
A. George Lee, 4103 Elmhurst, Royal Oak, Mich. 48073

Filed June 30, 1975, Ser. No. 591,454

Int. Cl.² A63D *15/00*

U.S. Cl. 273—4 A **4 Claims**





1. A pocket plug for use with a pocket billiard table having permanent rail assemblies with a solid support portion and a resilient cushion portion at the perimeter and above the top of the table interrupted by ball receiving pockets, said pocket plug comprising, a rail subassembly having a solid support portion and a resilient cushion portion mounted on said solid support portion, said plug being adapted to be disposed in a pocket of said table with an end in abutment with the permanent rail assembly adjacent to the pocket, and means including a bracket member mounted on said solid support portion of said pocket plug and having parts projecting beyond the end thereof and being adapted for detachable connection to said permanent rail assembly to maintain said pocket plug in said pocket with said resilient cushion portion thereon in alignment with the resilient cushion portion of said permanent

rail assembly, and fastening means associated with said bracket parts and adapted to releasably connect said bracket parts to said permanent rail assembly.

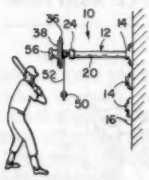
4. A pocket plug for use with a pocket billiard table having permanent rail assemblies with a solid support portion and a resilient cushion portion at the perimeter and above the top of the table interrupted by ball receiving pockets, said pocket plug comprising, a rail subassembly having a solid support portion and a resilient cushion portion mounted on said solid support portion, said plug having a vertical dimension less than the vertical dimension of said permanent rail assemblies and being adapted to be disposed in a pocket of said table with an end in abutment with the permanent rail assembly adjacent to the pocket, means operatively associated with said solid support portion of said pocket plug and a solid support of said permanent rail assembly to maintain said pocket plug in said pocket with said resilient cushion portion thereof in alignment with the resilient cushion of said permanent rail assembly, said means including a screw fastener releasably connecting said solid support portions of said permanent rail assemblies and said plug to each other with the latter in elevated relationship to the top of said table.

4,010,950

BASEBALL BATTING PRACTICE APPARATUS

Joseph N. Visockis, 5204 S. Lorel, Chicago, Ill. 60638

Filed Jan. 26, 1976, Ser. No. 652,542
Int. Cl.² A63B *69/00*
U.S. Cl. 273—26 E **5 Claims**



1. Baseball batting practice apparatus comprising:
a shaft adapted to be fixedly secured at one end thereof to a vertically extending surface;
an internal gear carried rotatably by said shaft and having an axial hub integral therewith;
an external gear carried rotatably by said shaft spring-biased into meshing engagement with said internal gear, said external gear having a lesser number of teeth than said internal gear and being mounted eccentrically relative to said internal gear so as to be in meshing engagement therewith through an arc located at one diametral region and in spaced relation to said internal gear at an opposite diametral region;
spring means for resiliently biasing said external gear axially of said shaft into engagement with said internal gear;
indicia on said external and internal gears for indicating the degree of rotation of said gears relative to each other;
and a ball element suspended from said hub of said internal gear.

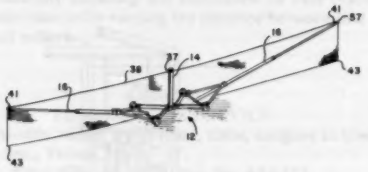
4,010,951

PORTABLE SUPPORT FRAME FOR A TENNIS NET

Thomas Richard Gronlund, 1835 Baldwin Drive, McLean, Va. 22101

Filed Nov. 25, 1975, Ser. No. 635,163
Int. Cl.² A63B *69/00*
U.S. Cl. 273—29 BC **17 Claims**

1. A portable support frame for a tennis net having its longitudinal axis extending horizontally, comprising:
a. a stable, horizontally disposed base;
b. a vertical support member rigidly attached at one of its ends to said base;
c. means for attaching the top of said tennis net to the remote end of said vertical support member providing support substantially at the center of said net;
d. a pair of beam support members, each of said pair being pivotally attached at one of its ends to said base, said pair of beam support members extending upwardly and outwardly from said base on opposite sides of said vertical support member, said beam and vertical support members being substantially in the same vertical plane; and



e. means for attaching the outer, top ends of said tennis net to the remote ends of said beam support members, said beam support members forming cantilever beams when said tennis net is attached thereto.

4,010,952

TABLE GAME

Robert J. Young, 5111 Virginia Ave., SE., Charleston, W. Va. 25304

Filed July 25, 1975, Ser. No. 599,021
Int. Cl.² A63B *39/00*
U.S. Cl. 273—30 **11 Claims**

1. A table game played with paddle and ball and including:
a. a playing surface;
b. a plurality of apertures formed in said playing surface for catching the ball, each aperture being larger than the diameter of the ball;
c. a plurality of platforms set at an angle to the playing surface, each platform projecting over an associated aperture to partially inhibit the aperture catching ball; and
d. means on said table dividing said playing surface into equal courts, each court containing the same number of said plurality of apertures and platforms, each platform being set along one edge of its associated aperture, the opposite edge of the aperture being toward the opposite court, one of the platforms in each court being set at a first angle and another one of the platforms in each court being set at a second angle.

4,010,953

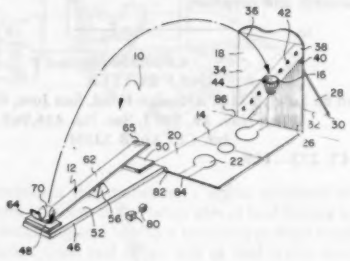
CATAPULT BASKETBALL GAME

Angelo Russo, 24-25 Kings Highway, Brooklyn, N.Y. 11229

Filed Aug. 4, 1975, Ser. No. 601,719
Int. Cl.² A63F *7/06*, *7/10*
U.S. Cl. 273—85 C **4 Claims**

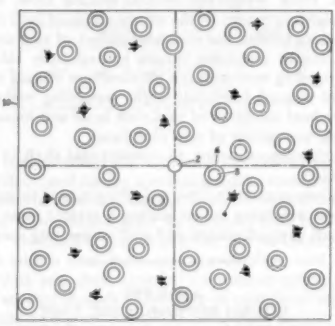
1. A catapult basketball game, which comprises:
a. a vertically aligned backboard;
b. a rectangularly shaped frame affixed to a rear surface of said backboard, said frame extending downwardly from said backboard at an acute angle;
c. a plurality of rubberized foot members affixed onto a base of said frame, said rubberized foot members adapted to engage the ground;
d. a basket with net affixed to a front surface of said backboard;

e. a rectangularly shaped member having a basketball court printed on a top surface thereof, one end of said member abutted against said backboard;
f. an elongated, rectangularly shaped foot member, said foot member abutted against another end of said rectangularly shaped member, and extending longitudinally outwardly therefrom;
g. a base of a triangularly shaped member affixed centrally to a top surface of said elongated foot member, said triangularly shaped member having a lateral aperture therethrough, said aperture towards an apex of said triangularly shaped member;



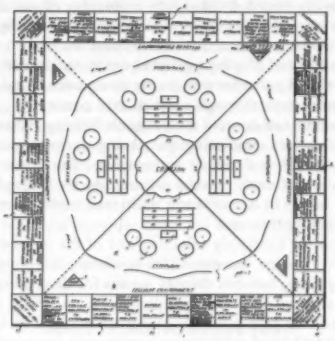
h. an elongated J-shaped ramp member having a curved end, said apex of said triangularly shaped member pivotally engaging a bottom center surface of said ramp member;
i. a C-shaped bracket extending through said lateral aperture, the ends of said C-shaped bracket affixed to said bottom surface of said ramp member;
j. a ball member resting in said curved end of said ramp member, another end of said ramp member adapted to be pushed downwardly by a player causing said curved end to move upwardly to propel said ball forwardly in a curved arc towards said basket; and
k. means for determining point valve for said ball member passing through said basket.

4,010,954
BOARD GAME APPARATUS
Donald N. Uding, 5022 N. Springfield, Chicago, Ill. 60625
Filed Sept. 5, 1975, Ser. No. 610,622
Int. Cl.² A63F *3/04*
U.S. Cl. 273—131 BB **9 Claims**



1. A monetary acquisition board game played by at least two players comprising:
a. a board with property sites and paths for random multidirectional movement toward any of a plurality of said property sites;
b. at least one marker for each player for representation of said movement;
c. first indicia having rates of movement for the markers of each player; and
d. second indicia displaying the acquisition status obtained by each player, with said acquisition status governing the type of property rights which may be purchased by each player.

4,010,955
CELL GAME
Richard Clay Nelson, P.O. Box 217, Glenwood, N. Mex. 88039
Filed June 18, 1975, Ser. No. 588,029
Int. Cl.² A63F *3/00*
U.S. Cl. 273—134 C **1 Claim**



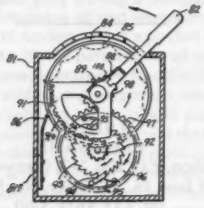
1. Game apparatus comprising a game board having a continuous playing path therearound and a central area; means in said central area defining representation of a living plant/animal cell including cell nucleus and nuclear membrane, cell cytoplasm, cell membrane; the area between the delineated playing path and cell membrane representing cellular environment; means in said area dividing the cytoplasm, nucleus and cellular environment into four equal playing segments; delineated areas within the cytoplasm and the entire area delineated by a segment of the nucleus with spaces to be filled during the course of play with playing components; said delineated areas on said game board having numerals matching those on the playing components; a delineated area within the cellular environment for pH cards; an area within the delineated cellular environment for placement of playing components; delineated cell membrane with spaces to permit movement of playing components from the cellular environment area of the playing board into the cytoplasm area of the playing board and from the cytoplasm area of the playing board into the cellular environment area of the playing board; a plurality of playing components dimensioned to fit within delineated spaces within the cell cytoplasm and cell nucleus; said components being marked with names and numerical values, the names being those of cell molecules and structures; said continous playing path divided into sequential areas, each having directions for a player in regard to placement of playing components onto or off of the playing board; a plurality of additional playing pieces known as pH cards which are marked to designate various values of pH and which may be taken from a single source outside the playing board and placed in delineated areas provided for said cards in the cellular environment; means of determining the extent of movement of playing pieces along said playing path.

4,010,956

DRAG RACING GAME APPARATUS

Gregory J. Zyla, P.O. Box 185, Pillow, Pa. 17080, and Michael T. Platt, Bethesda, Md., assignors to said Gregory J. Zyla, Pillow, Pa., by said Michael T. Platt

Division of Ser. No. 532,734, Dec. 13, 1974, Pat. No. 3,954,268. This application Jan. 16, 1976, Ser. No. 649,844
Int. Cl.² A63F *3/00*
U.S. Cl. 273—134 CA **4 Claims**



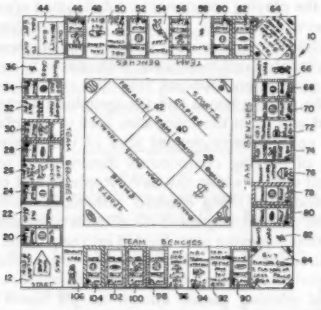
1. In an automobile racing game:
a. a playing board divided into a plurality of parallel paths;
b. each of said paths being divided into a plurality of zones and bearing spaced distance indicia;
c. a plurality of playing pieces equal in number to the number of said paths for advancing along each of said paths in discrete steps through each of said zones;
d. a plurality of control means each bearing indicia including numbers simulating the racing performance characteristics of a different automobile, for controlling the advance of each of said playing pieces through each of said zones in accordance with said racing performance characteristics; and
e. means for randomly selecting one of the numbers on said control means, the means for randomly selecting numbers comprising number display means for displaying one of a plurality of numbers; handle means movable into a selected one of a plurality of positions equal in number to the number of said zones; and means responsive to the movement of said handle between selected ones of said positions for causing said numbered display means to randomly display one of said numbers.

4,010,957

SPORTS GAME BOARD

Russell Tricoli, 729 Humboldt St., Secaucus, N.J. 07094

Filed Mar. 29, 1976, Ser. No. 671,321
Int. Cl.² A63F *3/00*
U.S. Cl. 273—134 AD **10 Claims**



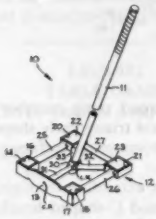
1. A game apparatus comprising:
a. a playing board including a continuous path of successive delineated spaces, a plurality of said spaces having indicia thereon related to sports teams and purchase prices for said teams, groups of said teams being related to the same sport;
b. a plurality of player pieces to indicate individual players;
c. a means of chance to indicate the movement of each player piece in turn a number of spaces along said path;
d. a plurality of stacks of cards having indicia thereon the terms of which relate respectively to awards and penalties, designated spaces in said path being associated with particular stacks;
e. a plurality of team player markers, groups of said markers being related to particular sports; and
f. a supply of play money for payment of various purchases, awards and penalties.

4,010,958

GOLF PUTTER

Steven K. Long, 17151 Almaden Road, San Jose, Calif. 95120

Filed Nov. 19, 1973, Ser. No. 416,969
Int. Cl.² A63B *53/04*
U.S. Cl. 273—169 **16 Claims**



1. A golf club comprising:
A. a club shaft;
B. a club head carried by the lower end of said club shaft, said club head having a substantially right-angled polygonal configuration in the plan view, said club head comprising:
a. a first weighting means located at the front heel corner of the club head,
b. a second weighting means spaced from said first weighting means in the toe-heel direction of said club head and located at the front toe corner of said club head,
c. a club face extending in the toe-heel direction,
d. a third weighting means spaced from said first weighting means in the aft direction of said club head and located at the rear heel corner of said club head,
e. a fourth weighting means spaced from said second weighting means in the aft direction of said club head and spaced from said third weighting means in the toe-heel direction of said club head and located at the rear toe corner of said club head,
f. shaft support means, to connect said shaft to said club head,
g. means connecting the weighting means to each other,
h. said weighting means having a greater mass than said shaft support means and said connecting means.

4,010,959

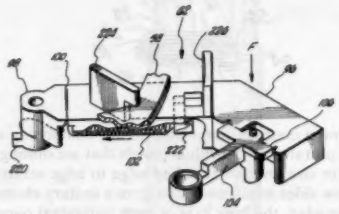
SOUND REPRODUCING UNIT

Jay Smith, III, 504 Marquette Ave., Pacific Palisades, Calif. 90272, and Richard F. M. Conroy, 22707 Burbank Blvd., Woodland Hills, Calif. 91364

Filed May 20, 1974, Ser. No. 471,351
Int. Cl.³ G11B *3/10*
U.S. Cl. 274—23 R **8 Claims**

1. A sound unit speaker system for producing sound sequences from a recording medium having sound indicia, comprising a speaker member having a generally cone configuration

to the apex of which a coupling element is joined, a vertically positioned link, one end of which is interconnected to said coupling element, a sound pick-up assembly connected to said link including a tone arm body member mounted for lateral and pivotal movement relative to said recording medium, a stylus mounting arm interconnected to said body member, flexure means hingedly interconnecting the stylus mounting arm to the body member along a hinge axis so as to provide for



relative movement therebetween, a stylus mounted on said mounting arm adjacent to the hinge axis of said flexure means, said stylus mounting arm having a receiving portion located in spaced relation from said hinge axis of said stylus mounting arm for receiving an end of said link for engagement therewith, so that said link is responsive to movement of said stylus for transmitting sound indicia motion from said stylus through said link to said speaker member.

4,010,960

ROTATING SEAL

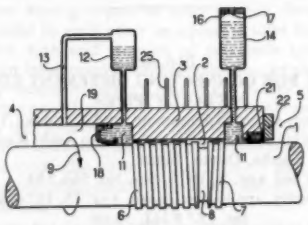
Jean Martin, Chatillon, France, assignor to Groupement pour les Activities Atomiques et Advancees "GAAA", Le Plessis-Robinson, France

Filed Oct. 7, 1975, Ser. No. 620,456

Claims priority, application France, Oct. 21, 1974, 74.35285

Int. Cl.² F16J *15/40*

U.S. Cl. 277—3 **18 Claims**



1. In a seal assembly for a rotating shaft effecting sealing by viscous effect, and having a rotating shaft extending through a bore formed in a wall separating, from the outside medium, an enclosure containing a fluid kept under high pressure, said assembly comprising, at the level of the bore, a sleeve mounted within said bore and surrounding said shaft and defining with said shaft opposed continuous cylindrical faces, first and second threads within one of said faces separated at their center by a groove and limited at their periphery by first and second lip seals for said rotating shaft, of the conventional type, two tanks of viscous liquid, cooling means, means for balancing the pressures between said viscous liquid and said high pressure fluid, the improvement wherein said threads have unequal lengths and are cut on one of the continuous cylindrical faces in opposite pitches such that each of said threads tend to drive said viscous liquid towards its periphery in the direction of the lip seals.

4,010,961

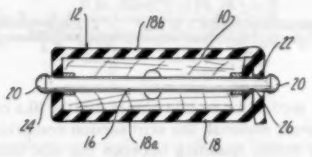
SKI TIE

David Paul Goode, 2015 Long Lk. Shores, Orchard Lake, Mich. 48033

Filed May 17, 1976, Ser. No. 687,170

Int. Cl.² A63C *11/02*

U.S. Cl. 280—11.37 A **8 Claims**



1. A device for binding a pair of skis together in spaced bottom-to-bottom relationship comprising: an elongate spacer rod of relatively pliable polymeric material having moderately enlarged integral heads on the opposite ends thereof, the length of said rod between said heads being about the width of a ski whereby the rod may be placed between a pair of skis with the heads extending beyond the lateral extremities thereof; and a strip of elastically elongatable material including a first aperture located approximately at its center, said strip in the configuration binding said skis being disposed on the rod adjacent one of the heads with said first aperture encircling said rod and having portions extending in opposite directions from said first aperture; second and third apertures in the strip near respective opposite ends thereof with one strip portion stretched over one ski in said pair and hooked over the opposite head via the second aperture and the other strip portion stretched over the other ski in said pair and hooked over said opposite head via the third aperture.

4,010,962

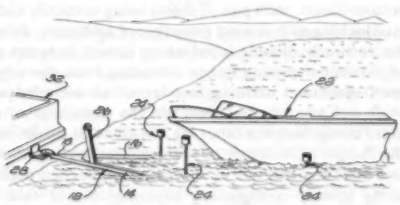
BOAT LOADING STRUCTURE

John T. Groblebe, 467 W. 8th St., Perris, Calif. 92370

Filed May 22, 1975, Ser. No. 579,841

Int. Cl.² B60P *3/10*

U.S. Cl. 280—414 R **4 Claims**



1. A boat loading structure comprising:

a boat trailer including a pair of longitudinally extending side rails;

at least one pair of bar assemblies, each of said bar assemblies of each pair being mounted on respective side rails, said pair being mounted in a plane generally perpendicular to said side rails;

each of said bar assemblies comprising:

a base secured to said side rails;

a vertical rod extending upwardly from said rail;

a spring interconnecting said base and one end of said vertically extending rod;

a roller member rotatably mounted on the other end of said spring rod; and

means for varying the spacing between the springs of each bar assembly pair for providing a continuous variable adjustment of the amount of pressure exerted by said roller members.

4,010,963
SKIRT FOR MOBILE HOMES

John E. Prentice, 1212 N. 950 West, Orem, Utah 84057

Filed Feb. 10, 1975, Ser. No. 548,850
Int. Cl.² B60R 27/00
U.S. Cl. 280—768 2 Claims

1. A skirt section for mobile homes and the like of substantially rigid sheet material, the skirt section comprising:

top panel means spanning between the side limits of the skirt section and defining at least two vertically extending lip means;

bottom panel means at least partially vertically overlapping the top panel means and spanning between the side limits of the skirt section, the bottom panel means comprising at least two lip means respectively contiguous with the lip means of the top panel means;

the respective pairs of contiguous lip means defining a track whereby the vertical span of the skirt section may be selectively adjusted and alignment preserved by relatively displacing the top panel means in respect to the bottom panel means along said track;

means for mounting the top edge of the top panel in suspended relation to a mobile home or the like;

each panel means comprising three separate pieces in series, the two end pieces in a common plane and the third in a second plane offset from but essentially parallel to the first plane and said mounting means comprising a bridge physically tying said three separate pieces of the top panel means together for unitary displacement and an additional bridge physically tying said three separate pieces of said bottom panel means together for unitary displacement.

2. A skirt section for mobile homes and the like, the skirt comprising:

at least three pairs of generally U-shaped telescopically related loosely partially vertically superimposed top and bottom sheets, each pair of sheets being vertically slidably interlocking with at least one other of said pairs of sheets, the vertically slidable interlocking feature between pairs of sheets comprising flange extending from the edge of each sheet and defining one leg of an included acute angle substantially less than 90° the remainder of each sheet comprising the other leg of said acute angle, two of the flanges of each pair of sheets projecting essentially in one direction and two in the opposite direction each two being loosely contiguously superimposed in said telescopic relation;

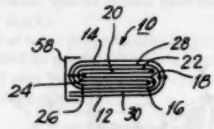
top bridge means rigidly connected to the top sheet of each of said pairs of sheets to secure said top sheets together so that said top sheets are manually relatively vertically displaced as a unit, said top bridge means comprising means for attaching the top bridge means to a mobile home or the like so that the skirt section is suspended at the periphery of the mobile home into the space between the ground and the floor of the mobile home;

bottom bridge means rigidly connected to the bottom sheet of said pairs of sheets to secure said bottom sheets together so that said bottom sheets are manually relatively vertically displaced as a unit in respect to the top sheets, to allow the bottom bridge means to engage the ground upon manual telescopic adjustment of the vertical height for the skirt and the skirt section to thereby span the full distance between the ground and the floor of the mobile home at said periphery.

4,010,964
PRINTED COUPON FOLDER

Sheldon Schechter, 34 Bush Parkway, East Brunswick, N.J. 08816

Filed Oct. 29, 1975, Ser. No. 626,629
Int. Cl.² B42D 15/04
U.S. Cl. 283—56 8 Claims

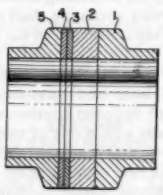


1. A printed coupon direct mail folder comprising an even numbered plurality of individual panels that are oblong in plan and equal in size and are attached edge to edge seriatim with their narrow sides in alignment to form a unitary element that is oblong in plan, the long axis of each individual panel being perpendicular to the long axis of said element, each of said individual panels bearing printed promotional material related to an associated saleable item, at least one of said individual panels bearing a printed redemption coupon, said printed coupon providing for the purchase of the associated saleable item at a predetermined reduction in price, each of said individual panels being connected across said element to an adjacent individual panel by a rectilinear weakened zone, said weakened zones being perpendicular to the long axis of said element, said element being folded by a plurality of parallel over-and-over folds to a member that has the plan size of a single individual panel and a thickness of all of said individual panels combined, said parallel over-and-over folds including a first fold whereby the oblong element is folded in half with the endmost individual panels being registered in planar parallelism and the weakened zones in each half being superimposed, and succeeding parallel over-and-over folding of said element at said superimposed weakened zones exclusive of said endmost panels, terminating with a final parallel over-fold of the element exclusive of said endmost individual panels onto said registered endmost individual panels, and means to secure said folder in folded condition against premature opening.

4,010,965
PIPE JOINT FOR CONNECTING DIFFERENT KINDS OF METALLIC PIPES

Takeshi Izuma; Chiyoshi Fukumoto, and Kazuhiko Yamaura, all of Takashimagun, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 8, 1975, Ser. No. 566,534
Claims priority, application Japan, Apr. 15, 1974, 49-40941
Int. Cl.² F16L 55/00
U.S. Cl. 285—173 2 Claims

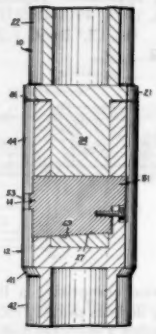


1. A pipe joint for connecting an aluminum pipe to a stainless steel pipe, which comprises washer layers of aluminum, titanium, nickel and stainless steel in this order, each washer layer being welded to the adjacent layers in the axial direction of the pipe joint by explosive bonding.

4,010,966
PIPE COUPLER

Paul G. Vanden Bosch, Box 222, Gregory, S. Dak. 57533

Filed Mar. 18, 1976, Ser. No. 668,205
Int. Cl.² F16L *21/00, 25/00*
U.S. Cl. 285—403 5 Claims



1. A pipe coupler comprising:

a. a male coupler element having a rearward end adapted for attachment to a pipe and a fluid passageway through said element generally along the longitudinal axis thereof, said element having a non-circular cross sectional configuration and a pair of recesses formed in the outer surface of said element on opposite sides thereof, said recesses having forward walls transverse to said longitudinal axis;

b. a female coupler element having a rearward end adapted for attachment to a pipe, the forward portion of said element having a non-circular bore configured to conform to the outside shape of said male coupler element for telescopic non-rotational engagement therewith, said female coupler element having an internal narrowing step adjacent said forward portion for abutment with the forward end of said male coupler element when telescopically engaged therewith, said step having a fluid passageway therethrough in alignment with the fluid passageway of said male coupler element, said female coupling element having a pair of slots formed therein extending parallel to each other on opposite sides thereof in alignment with said recesses of said male coupler element when telescoped in said female coupler element;

c. key means including a pair of key blocks each sized to fit within one of said slots in position within said recess, each key block having a first edge for engagement with a surface of the slot of said female coupler element and having a second edge at an acute angle to said first edge for wedging engagement with said forward wall of said recess; and

d. means for securing said key blocks within said slots so as to wedge said male coupling element into place with its forward end in fluid sealing abutment with said internal step of said female coupling element.

4,010,967
GASOLINE TANK CLOSURE FOR A MOTOR VEHICLE

Isaac Renteria, Jr., Houston, Tex., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

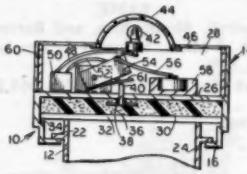
Filed Jan. 21, 1976, Ser. No. 650,850
Int. Cl.² E05B *19/18*
U.S. Cl. 292—251.5 8 Claims

1. A closure for an automobile gas tank or radiator comprising:

a cylindrical body having a top and a bottom wall adapted to be attached to an automobile gas tank or radiator,

a light secured to said top wall, and

electrical circuit means within said cylindrical body between said top and bottom walls for activating said light in

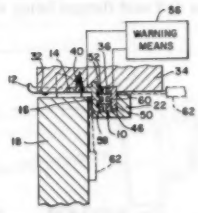


response to removal of said closure from said automobile gas tank or radiator.

4,010,968
LATCH GUARD

Arthur W. Rehfeld, Arleta, Calif., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Mar. 10, 1976, Ser. No. 665,525
Int. Cl.² E05C *1/12*
U.S. Cl. 292—346 1 Claim



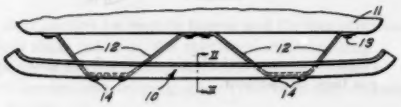
1. In a latch guard having a mounting flange mountable in overlying relation to the inner face of a jamb in the vicinity of keeper means located on the jamb, and a blocking flange integrally fixed along one edge of the mounting flange substantially at right angles thereto so as to lie in a first plane paralleling, and adapted to overlie the abutment face of a jam-mounted stop, the blocking flange projecting laterally on a side of the mounting flange facing the door, the mounting flange having an enlarged recess defined centrally therein, the improvement wherein a portion of the blocking flange projecting along and beyond the full length of the recess in a direction away from the door has a plurality of toothed segments formed therein, and further comprising a conductive plate lying in a second plane paralleling the first plane and normally spaced therefrom in a direction away from the door, and at least one non-conductive compression spring being interposed between said plate and said blocking flange for urging said plate in a direction away from said blocking flange, and wherein the stop and the jamb are formed with first and second recesses, respectively to receive said blocking flange, said spring, and said plate, and wherein the blocking flange and said plate are formed with projections facing one another, respectively, the blocking flange is conductive, and the latter and said plate are adapted to be electrically coupled to an intruder-actuated warning means, respectively, whereby, upon an intruder attempting to selectively jam a prying tool between the jamb and the stop, and between the door and the stop, said projections make electrical contact with one another and actuate said warning means.

4,010,969

IMPACT RESISTANT LIGHTWEIGHT, LOW COST AUTOMOBILE BUMPERS AND METHOD OF MAKING SAME

Ronald G. Cantrell, Birmingham, and Barron L. Katchka, Pontiac, both of Mich., assignors to Houdaille Industries, Inc., Buffalo, N.Y.

Filed May 17, 1973, Ser. No. 361,245
Int. Cl.² B60R *19/02*
U.S. Cl. 293—98 **16 Claims**



16. A bumper bar adapted to be mounted protectively across an end of an automotive vehicle;

the bar being formed from easily workable sheet or strip steel and having an elongated body portion and spaced apart integral portions extending angularly away from the body portion;

said body portion being heat and quench hardened throughout its major extent to provide it with yield strength to withstand repeated impact of a high order of magnitude without significant damage;

said spaced apart portions being at least in part free from heat and quench hardening adjacent to said body portion and comprising flanges along upper and lower sides of said body portion; and

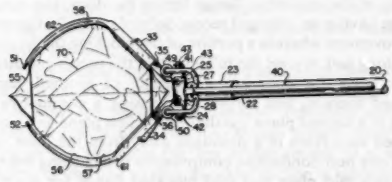
areas lying at or near the vertical neutral axis between said body portion and said flanges being unhardened.

4,010,970

WASTE RECEIVER FOR DOGS

John R. Campbell, 776 Holly St., New Milford, N.J. 07646

Continuation-in-part of Ser. No. 540,841, Jan. 14, 1975, abandoned. This application Apr. 21, 1976, Ser. No. 678,990
Int. Cl.² A01K *29/00*
U.S. Cl. 294—19 R **20 Claims**



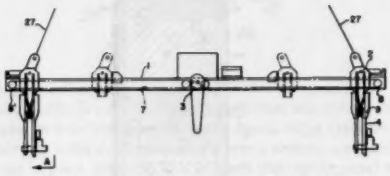
14. A waste receptacle for pet toilet use adapted to be supported by curved cooperating arms having free ends which touch each other, said receptacle having a top opening with two sides of said opening, tubular portions of said receptacle extending at least partially along the outside of said top opening, pressure sensitive fastening means extending within and along at least one side of said opening and in a parallel position to said tubular portions in a plane parallel to the plane of said opening, whereby said receptacle may be supported along said tubular portions by said arms and said fastening means are closed when engaged by said arms during withdrawal of said receptacle over the touching free ends of said arms.

4,010,971

LIFTING DEVICE

Yuzuru Kuwamoto, Yokohama, and Noboru Uchiyama, Kanagawa, both of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 20, 1975, Ser. No. 579,263
Claims priority, application Japan, May 31, 1974, 49-62747[U]; July 16, 1974, 49-84016[U]
Int. Cl.² B66C *1/28*
U.S. Cl. 294—81 R **3 Claims**



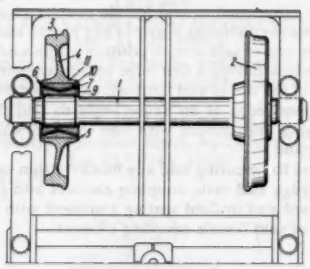
1. A lifting device comprising a lifting beam, a pair of shackle suspending devices slidably mounted upon said lifting beam, means including a sprocket and driving chain for moving said suspending devices toward or away from each other, a shackle device including a shackle pin, means for attaching a shackle device to each of said suspending devices including a rotary pin, means for adjusting the angular position of each of said shackle devices, and means for advancing each shackle pin into an attaching hole of a block or retracting each shackle pin from said attaching hole.

4,010,972

AXLES RESILIENTLY MOUNTING WHEELS

Manfred Schindehutte, Calden; Erwin Raquet, Sprockhovel, and Helmut Licht, Bochum, all of Germany, assignors to Fried. Krupp Huttenwerke AG, Bochum, Germany

Filed Jan. 24, 1975, Ser. No. 543,907
Claims priority, application Germany, Feb. 13, 1974, 2406880
Int. Cl.² B60B *9/12, 17/00, 27/00, 37/00*
U.S. Cl. 295—11 **5 Claims**

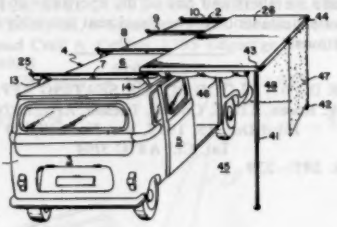


1. Wheel set for a bogie of a track vehicle, comprising an axle rotatably mounted in bearings of a bogie, wheels mounted fixed to the axle, a substantially wide rubber elastic insert for springing each said wheels, said rubber elastic insert having an arched axial-radial cross-section, the height of the arch in radial direction being substantially small relative to the width of the arch, said insert being arranged between the wheel hub and wheel rim in the proximity of the hub boring and extending substantially over the whole width of the wheel hub, the apex of the arched insert facing the hub boring, and an outer part comprised of individual circular segments surrounding substantially said rubber elastic insert.

4,010,973
MOTOR CAMPER ACCESSORY

Manfred G. Heinrich, Richmond, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Sept. 8, 1975, Ser. No. 611,569
Int. Cl.² B60P 3/32
U.S. Cl. 296—23 R **3 Claims**



1. A motor camper accessory for a motor camper vehicle having a front, a rear, a pair of sides and a roof extending from front to rear and side to side, said motor camper accessory comprising

a plurality of spaced tracks affixed to the roof of a vehicle and extending from side to side of the vehicle in substantially parallel relation with each other, each of the tracks being of T-shaped cross-section and being bent upward at the driver's side of the roof;

a platform having approximately the same dimensions as the roof of the vehicle and having roller means affixed to an underside thereof rollably mounting the platform on the tracks for movement to a position covering the roof and to an extended position extending beyond the roof from a side of the roof in approximately the plane of the roof; and

support posts for supporting two corners of the platform farthest from the vehicle when the platform is in its extended position for maintaining said platform at approximately the level of the roof above the ground whereby said platform in its extended position covers an area of ground alongside the vehicle.

4,010,974
MULTIPLE COMPARTMENT STRUCTURE

Donald F. Day, 9213 Tamarind, Fontana, Calif. 92335

Continuation of Ser. No. 350,515, April 12, 1973, abandoned.
This application Oct. 4, 1974, Ser. No. 511,993
Int. Cl.² B60P 3/04
U.S. Cl. 296—24 C **6 Claims**

1. A structure forming a plurality of layers of compartments arranged in vertical tiers and supported on an underlying base, comprising:

a first wall member and a second wall member for each compartment of a tier cooperative to form at least the two opposite side walls and the rear wall of the compartment,

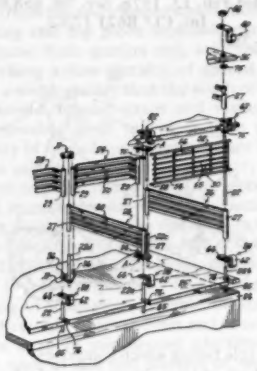
at least one of said wall members forming an angle in plan configuration, one leg of the angle forming one side wall of the compartment, the other leg of the angle forming at least part of the rear wall of the compartment,

each of said wall members having two horizontally spaced upright passages therethrough;

a plurality of horizontal panels forming floors and ceilings of the compartments; and

a group of four rods in each tier extending upward from said base through the horizontal panels,

said four rods including two rods extending through the two upright passages of the first wall members of the tier and two rods extending through the upright passages of the

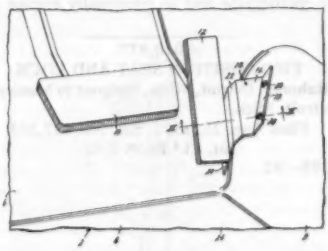


second wall members of the tier to hold the wall members in their assembled positions.

4,010,975
AUXILIARY FOOTREST FOR AUTOMOBILES

Frank Horton, 302 Broadway, Lamar, Mo. 64759

Filed Nov. 21, 1975, Ser. No. 634,265
Int. Cl.² B60N 3/06
U.S. Cl. 296—75 **6 Claims**



1. In combination with an automobile equipped with the usual accelerator pedal and the usual brake pedal disposed to the left of said accelerator pedal, both pedals being operable by the right foot of the driver, said automobile being equipped with an automatic speed regulating system commonly known as a cruise control system operable when activated to maintain the automobile at a pre-set speed, said cruise control system when activated requiring that the driver's right foot be removed from both of said pedals, an auxiliary footrest for the right foot of the driver, said footrest comprising:

a. a generally planar rigid step,

b. means at the right edge of the step connecting said step rigidly to the body of said automobile and positioning said step with its plane generally parallel to and above the plane of said accelerator pedal when said pedal is in its normal raised position, and immediately to the right of said accelerator pedal, and

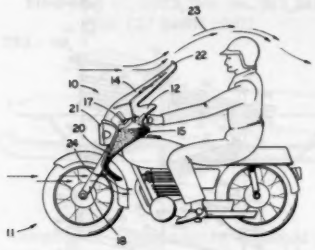
c. a generally planar apron secured along its upper edge to the left edge of said step and extending generally vertically downwardly therefrom past and below the right edge of said accelerator pedal to a point at least as low as the upper surface of said pedal when said pedal is in its fully depressed position, the apron being secured only to the left edge of the generally planar step.

4,010,976

MOTORCYCLE FAIRING

William D. Shields, R.R. 6 Lake Edgewood, Martinsville, Ind. 46151

Filed Feb. 13, 1976, Ser. No. 658,036
Int. Cl.² B62J *17/02*
U.S. Cl. 296—78.1 **10 Claims**



1. A motorcycle fairing which comprises:

a formed sheet of transparent material, the formed sheet including first portions extending across and spaced apart from the front of the motorcycle handlebars, a second portion extending above the handlebars to shield the motorcycle rider's face, and third portions extending downwardly along opposite sides of the front fork of the motorcycle; and

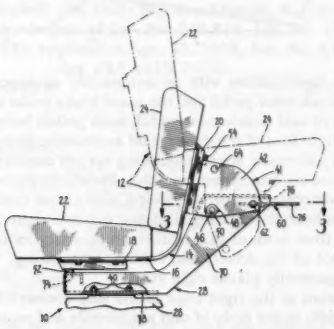
connecting means for attaching the third portions to the front fork of a motorcycle, said connecting means comprising a gasket extending along the third portions, the gasket comprising a flexible, resilient material, the third portions being spaced apart a distance sufficient to cause the gasket to be deformed against the front fork of the motorcycle and to frictionally engage the front fork.

4,010,977

TWO POSITION SEAT AND LOCK

Habibur Rahman, Detroit, Mich., assignor to Massey-Ferguson Inc., Detroit, Mich.

Filed Aug. 25, 1975, Ser. No. 607,313
Int. Cl.² B60N *1/02*
U.S. Cl. 297—92 **6 Claims**



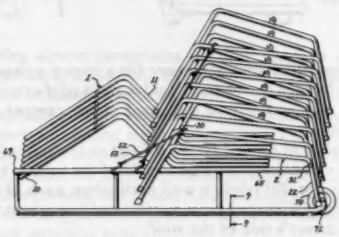
1. A two position vehicle seat supported on a vehicle portion comprising: a pair of parallel plate members extending longitudinally of a vehicle and vertically upward, a seat assembly having a pair of body supporting portions disposed at an angle to each other, a pivot member pivotally connecting said seat assembly to said plate members for movement about a transverse axis spaced from the vehicle portion, a bracket member mounted on one of said body supporting portions, said bracket member forming a pair of apertures spaced from each other and equally spaced from said transverse axis, one of said plate members forming an aperture also equally spaced from said transverse axis and coincidental alternately with the apertures of said bracket member, lock means for maintaining one of said body supporting portions in a position below said transverse axis to form a seat and for maintaining both said supporting portions above said transverse axis in a second position where said one supporting portion forms a backrest and the other supporting portion a seat, said lock means including a lock assembly movably supported on one of said plate members for engagement with the apertures of one of said plate members and one of the apertures of said bracket member simultaneously when said seat assembly is in one of its positions.

4,010,978

TAKE DOWN BLOOD DONOR SEATING APPARATUS

Evan W. Rosen, 110 S. Cuesta, Tucson, Ariz. 85705

Filed Dec. 15, 1975, Ser. No. 640,870
Int. Cl.² A47C *3/04*
U.S. Cl. 297—239 **4 Claims**



1. An easily transported integrally nested take down chair ensemble for erecting reclinable chairs at a facility, said ensemble comprising in combination:

a. a stretcher-like dolly for receiving and transporting said reclinable chairs to and from the facility, said dolly including a framework having webbing extending thereacross and defining a platform, a pair of wheels disposed at one longitudinal end of said dolly, and a U-shaped handle extending from another longitudinal end of said framework for defining a circumscribed area adjacent said other end;

b. a body support structure having a backrest, a seat and a leg rest for supporting a person upon said reclinable chair, said body support structure being of a width less than the lateral dimension of said dolly to prevent lateral overhang of said body support structure upon placement of said body support structure upon said platform and having a part of the backrest extending into the circumscribed area of said dolly;

c. a base for supporting said body support structure, said base including a pair of mirror image inverted U-shaped members interconnected by rods, each said U-shaped member including a vertically oriented lower part and an inwardly canted upper part, said lower parts of said U-shaped members being spaced apart from one another by said rods by a distance equivalent to the width of said dolly such that on placement of said base upon said dolly subsequent to placement of said body support structure upon said dolly, said platform supports one of said rods, said body support structure supports another of said rods and said lower part depends downwardly adjacent the sides of said dolly to prevent lateral movement of both said body support structure and said base with respect to said dolly;

d. a pivot bracket extending upwardly from said upper part of each said U-shaped member for pivotally mounting said body structure;

e. a pair of pivot pins attached to the seat for disengageably engaging respective ones of said pivot brackets; and

f. manually releaseable latch means disposed upon said upper part of each said U-shaped member for selectively

inhibiting rearward pivotal movement of said body support structure mounted upon said base;

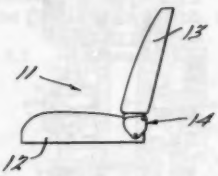
whereby, said dolly transports said base without danger of lateral displacement of said body support structure and said reclinable chair is readily erectable by engaging said pivot pin of said body support structure with said pivot bracket of said base.

4,010,979

LATCH STRUCTURE FOR VEHICLE SEATS

Alfred J. Fisher, III, 9 Stratford Place, Grosse Point, Mich. 48230, and Cecil A. Collins, 1355 Edgeorge Drive, Pontiac, Mich. 48054

Filed May 24, 1976, Ser. No. 689,033
Int. Cl.² B60M 1/02
U.S. Cl. 297—379 **5 Claims**



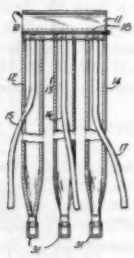
1. A latch structure for preventing movement of a vehicle seat back relative to the vehicle seat during deceleration of the vehicle, said latch comprising a bracket on said seat having a first latching recess therein, a latching member on said seat back having a second latching recess therein, a primary inertia member having a latch pin thereon engageable in said first and second latching recesses to preclude relative movement of said bracket and latching member, said primary inertia member being movable due to inertia forces from an unlatched position to a latched position upon the occurrence of said deceleration, said primary inertia member having a track therein, and a secondary inertia member movable along said track from a normal position to an inertia induced position, said secondary inertia member being operable to maintain said primary inertia member in a latched position after movement of said secondary inertia member from its normal position along said track toward the inertia induced position.

4,010,980

COVERS FOR OUTDOOR CHAIRS

Emanuel Dubinsky, 99 Kingston Ave., Yonkers, N.Y. 10701

Filed Jan. 3, 1975, Ser. No. 538,455
Int. Cl.² A47C 7/00
U.S. Cl. 297—441 **3 Claims**



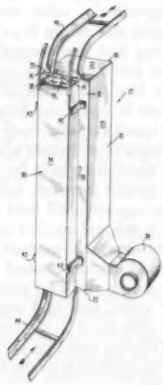
1. In a horizontal vinyl-like tubular covered chair having a frame having a seat portion and a back portion and having a plurality of originally installed vinyl-like horizontal tubular straps extending around said frame across said back and seat portions thereof and fixed to said frame, said oringinally installed horinzontal tubular straps extending parallel to each other with spaces between adjacent oringinally installed horizontal tubular straps; the improvement comprising a removable cover for reinforcing and enhancing the effective duration of said oringinally installed horizontal vinyl-like tubular covering for said chair, said removable cover comprising a tubular top piece removably mountable over the top of said frame back portion, said removable cover top piece comprising a pair of opposed front and rear separable portions removably connectable together to fix said top piece about said frame back portion top and a zipper means thereon for removably connecting said top piece separable portions together about said frame back portion top, said removable cover further comprising a first plurality of spaced apart parallel straps having a width greater than the width of said originally installed horizontal tubular straps and vertically extending from said removable cover top piece front portion and a second plurality of spaced apart parallel straps having a width narrower than said straps of said first plurality and vertically extending from said removable cover top piece rear portion, said first and second plurality of vertically extending straps being equal in number and being disposed on said respective front and rear portions with a respective corresponding strap of said second plurality substantially coaxial with a respective strap of said first plurality, each of said straps of said first plurality having an adjustable self-tightening tension means at the free end thereof in which the free end of said corresponding respective strap of said second plurality is removably interlockable, each of said first plurality of vertically extending straps being weavably threadable through selected ones of said originally installed horizontal tubular straps and lockable in place by interlocking with said corresponding strap of said second plurality behind said frame seat portion for reinforcing said originally installed horizontal tubular straps.

4,010,981

AIR CONVEYOR WITH TUNNEL GUIDE

Trevor A. Hodge, Maple Down, Crown Road, Buxton, Norwich NOR 61Y, England

Continuation of Ser. No. 399,356, Sept. 20, 1973, abandoned.
This application July 21, 1975, Ser. No. 597,623
Int. Cl.² B65G 51/02
U.S. Cl. 302—2 R **9 Claims**



1. An air conveyor for vertically lifting articles having a generally uniform exterior configuration comprising a plenum chamber, means for supplying pressurized air to the plenum chamber, a deck plate covering said plenum chamber and having a plurality of slots therein configured to issue pressurized air from the plenum in the form of directional air jets having a predominant flow component along the surface of the deck plate, an imperforate wall member mounted in spaced relation to the deck plate and being in confronting relation to the deck plate slots, said wall member extending along said deck plate and together with said deck plate defining a conveying zone to trap and conserve the conveying air, said wall member having an interior surface conforming to the exterior surface of the articles conveyed and defining a small air space between the interior surface of said wall member and each of said articles, said wall member having at least one

edge extending substantially the full length of the wall member, air gap means extending substantially the full length of said wall member along said edge providing for limited escape of air from within the conveying zone to prevent the buildup of air back pressure within said zone, means supporting said air conveyor in a direction having a substantial vertical component for moving articles from a lower to a higher elevation, and said imperforate wall member and said deck plate together provide a cross-section substantially similar to the cross-section of the articles being conveyed.

4,010,982

VEHICLE-TRAILER BRAKING SYSTEM

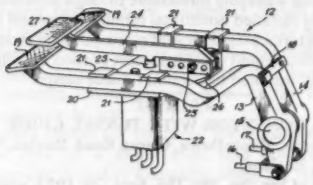
Stuart James Cameron Grossart, Coventry, England, assignor to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles

Filed Sept. 30, 1975, Ser. No. 618,198

Claims priority, application United Kingdom, Oct. 2, 1974, 42839/74; Oct. 4, 1974, 43263/74

Int. Cl.² B60T *13/14*

U.S. Cl. 303—10 **6 Claims**



1. A braking system having a source of pressurized fluid, a reservoir, a hydraulic actuator, a brake, said actuator operable to cause engagement of said brake, a return and a supply line connecting said actuator with said reservoir and source of pressurized fluid, respectively, valve means for controlling flow through said supply and return lines including a body, a spool, said body having first and second ports therein, said first port connected to said supply line, said second port connected to said return line, said spool closing said first port when said second port is open and vice versa, a chamber formed between said spool and said body and means for biasing said spool including a first conduit connecting said chamber to said actuator for biasing said spool on said chamber side, and a second conduit between said actuator and said chamber to provide an unrestricted fluid path with said spool in said first position, a manual control device and a resilient connecting means between said manual control device and said spool to permit said manual control device to move said spool to a position opening said first port and then said conduit for biasing said spool, and said means for biasing said spool to then return said spool to a second position opening said second port and closing said first port to maintain a force on the brake system proportional to the force applied on said manual control device.

4,010,983

DUAL BRAKE CIRCUIT VALVE ASSEMBLY

Ralph Coupland, Lincoln, England, assignor to Clayton Dewandre Company Limited, Lincoln, England

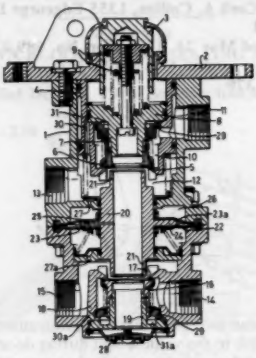
Filed May 29, 1975, Ser. No. 581,846

Claims priority, application United Kingdom, June 13, 1974, 26285/74

Int. Cl.² B60T *15/12*

U.S. Cl. 303—40 **2 Claims**

1. A dual brake system valve assembly comprising a housing provided with respective sets of fluid pressure inlet and delivery ports connected into respective braking circuits, means defining passages within the housing between the inlet and delivery ports on each set, a poppet type valve member in each passage, said valve members being slidably mounted in coaxial relation within said housing and having adjacent one ends, means biasing said valve members to close pressure transmitting communication between the ports of each set through their respective associated passages, operating means for substantially simultaneously displacing said valve members to interconnect the related inlet and delivery ports in pressure transmitting communication through their respective passages for actuating brakes in the respective circuits, said operating means including a thrust member disposed between said adjacent one ends of said valve members, and means whereby during brake actuation the delivery pressure in each passage is applied in force balancing relation to non-adjacent end areas of the associated valve member, said thrust member comprising a tubular exhaust valve structure disposed coaxially between said two valve members and mounted by a diaphragm assembly, and spaced at opposite sides of the diaphragm assembly being connected respectively to the two delivery ports so that effective delivery pressures across the exhaust valve structure are balanced.



4,010,984

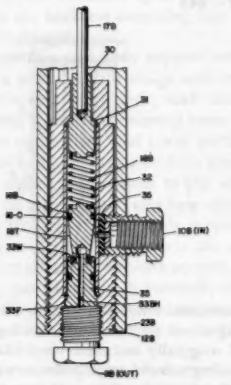
INTERNAL HYDRAULIC SEALING FOR A VEHICLE LOCKING DEVICE

James A. Coleman, 2250 E. 105th St., Cleveland, Ohio 44106

Filed Nov. 3, 1975, Ser. No. 628,333

Int. Cl.² B60T *17/16*

U.S. Cl. 303—89 **3 Claims**



1. In a locking device,

a ported cylinder,

a soft metal liner which is coaxially arranged within the cylinder,

a piston valve located coaxially within the liner,

a valve seat co-operable for mating said piston valve, said valve seat incorporating a relatively hard metal which has a flared portion for mating with an end of said soft metal liner, and

a cylinder port fitting having wrench accomodating flats and arranged for threaded engagement advance within the ported cylinder whereby advancement of the valve seat flared portion against the soft metal liner forms an internal seal.

4,010,985

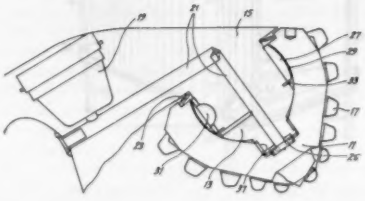
ROTARY DRILL BIT

Ian Graeme Rear, 53 Louise St., Nedlands, Western Australia, Australia (6009)

Filed Dec. 23, 1975, Ser. No. 643,939

Int. Cl.² F16C *19/00*

U.S. Cl. 308—8.2 **10 Claims**



1. A rotary drill bit comprising a bit head and roller cutters mounted on said head, a shaft fixed at one end to the bit head, each roller cutter being rotatably mounted on said shaft, said shaft being provided with an annular formation having a substantially spherical outer surface thereon, any one point on the surface having a center of curvature on the diametric axis of the annular formation which intersects that point, said spherical outer surface forming a bearing surface of said shaft, each said roller cutter being provided with a correspondingly formed bearing surface to surround the spherical outer surface of the annular formation and bearingly engage said surface.

4,010,986

BEARING ARRANGEMENT FOR A VEHICLE WHEEL

Heinz Otto, Wolfsburg, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

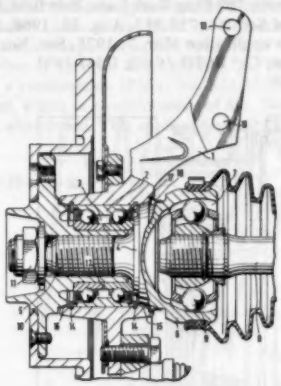
Filed Dec. 31, 1975, Ser. No. 645,796

Claims priority, application Germany, Feb. 7, 1975, 2505081

Int. Cl.² F16C *13/00*

U.S. Cl. 308—16 **3 Claims**

1. An improved bearing arrangement for a vehicle wheel, particularly of an automobile, having in combination an outer component provided with a bore and an inner axle component journalled in the bore and supported therein by means of a bearing, whereby one of the components is connected to a wheel for the vehicle and the other component is connected to wheel guiding elements articulated on the vehicle body, the surfaces of said components in the vicinity of the bore defining a gap between them extending in toward the bearing, wherein the improvement comprises a bearing-protecting packing arrangement at an entrance of the gap which includes an annular groove, concentric with the bore, defined on the surface of the outer component in the vicinity of the bore and leading widthwise in toward the bore and a complementary annular slinger ring fixed on the surface of the inner axle component in the vicinity of the bore, said annular ring cooperating with and projecting into the groove so as to substantially prevent foreign elements from entering the gap and contaminating the bearing in the bore.



4,010,987

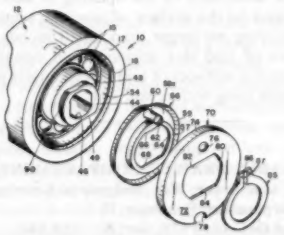
REMOVABLE SEAL FOR BEARINGS

Philip D. Jasperse, Zeeland, and Jerry L. Redmann, Jr., Sparta, both of Mich., assignors to C. L. Frost & Son, Inc., Grand Rapids, Mich.

Filed Oct. 23, 1975, Ser. No. 625,110

Int. Cl.² F16C *1/24*

U.S. Cl. 308—187 **24 Claims**

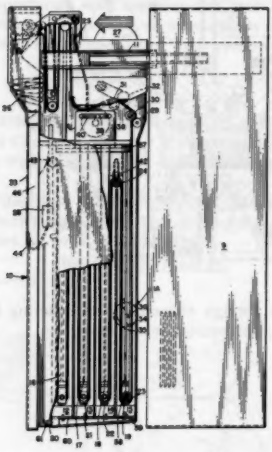


1. A bearing assembly comprising inner and outer annular bearing races spaced apart from one another, anti-friction bearing means interposed between said races for rotatably supporting one race with respect to the other; means for axially positioning said anti-friction bearing means; said assembly adapted to be supported on a support extending through said assembly; an extension extending laterally to one side of said inner race; shield means mounted on said extension for covering the opening between said races at the side of said assembly, said shield means including an aperture therethrough for receiving said extension; removable securing means for retaining said shield means including resilient retaining means for constantly maintaining engagement with said extension to hold said shield means on said extension and means allowing removal of said resilient retaining means and shield means without removing or disassembling said bearing assembly from any support for the assembly when the assembly is mounted thereon such that the shield means and retaining means are removable without disassembly of any other portion of the assembly or removal of the assembly from its support.

4,010,988
TOWEL APPARATUS

James W. Schwartz, 782 Shag Bark Lane, Deerfield, Ill. 60015

Continuation of Ser. No. 755,013, Aug. 23, 1968, Pat. No. 3,884,630. This application Mar. 7, 1975, Ser. No. 556,104
Int. Cl.² B65H *19/00*; D06I *1/00*
U.S. Cl. 312—38 7 Claims

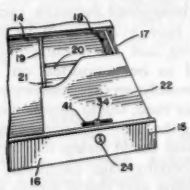


1. Apparatus for dispensing rolled fabric toweling including a cabinet and a clean toweling storage compartment, means for allowing manual withdrawal of lengths of clean toweling from said clean toweling storage compartment and said cabinet, and electric motor driven means for retracting lengths of use toweling to within said cabinet, a slot located in the surface of said cabinet through which said toweling is caused to pass upon retraction of said lengths of use toweling to within said cabinet, the dimension of the opening of said slot in a direction transverse to the surface of toweling sections lying within said slot being no larger than 0.070 inches, and the external surfaces of said slot adjacent said opening being abruptly joined to the surfaces of said slot generally parallel to said towel sections lying within said slot.

4,010,989
LOCKABLE DRAWER COMPARTMENT

Joseph R. Klug, Manitowoc, Wis., assignor to American Hospital Supply Corporation, Evanston, Ill.

Filed Oct. 14, 1975, Ser. No. 622,146
Int. Cl.² A47B *88/00*
U.S. Cl. 312—204 6 Claims

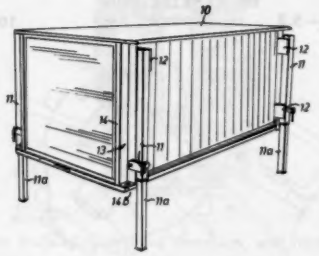


1. A drawer for use with a supporting frame in which the drawer is movable between open and closed positions and is provided with a compartment therewithin, a cover for the compartment movably mounted on the drawer, the cover being movable between a closed position in which access to the compartment is prevented and an open position in which the compartment is substantially uncovered, and locking means on the drawer movable between a first position in which both the drawer and the cover of the drawer compartment are locked in their closed positions, a second position in which the drawer is unlocked and the cover is locked, and a third position in which both the drawer and the cover are unlocked and are freely movable between their open and closed positions.

4,010,990
GOODS CONTAINER FOR TRANSPORT PURPOSES

Robert John Rowley, Peterborough, and David Allen, Kettering, both of England, assignors to Modular Distribution Systems Limited, Kettering, England

Filed Oct. 20, 1975, Ser. No. 624,244
Claims priority, application United Kingdom, Oct. 21, 1974, 45387/74
Int. Cl.² A47B *91/00*, *95/00*; F16M *11/16*
U.S. Cl. 312—255 8 Claims



1. A goods container for use in containerised goods transport systems, comprising a container body which is provided at each vertical corner with a retractable leg structure, said structure comprising a fixed pillar having a vertically-extending recess which is open laterally of the container, a tubular post hinged to said pillar to swing about a vertical axis between a stowed position within the recess and an operative positio· extending laterally outboard of the container, a hollow ground-engaging leg slidably engaged in the tubular post to move vertically, each of said post and leg being of corresponding rectangular cross-sections, a ram accommodated within and connected between the post and the leg to effect sliding of the leg, and locking means for retaining the post in its stowed and operative positions, the locking means including a part which is mounted on the pillar to move into and out from the recess and which engages the post in its operative position to prevent the post moving to its stowed position and which is retained in the recess by the post when the latter is stowed.

4,010,991
METHOD FOR DEVACUATING A VACUUM TUBE

George Ernest Eiwen, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

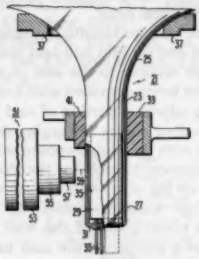
Filed Feb. 4, 1974, Ser. No. 439,561
Int. Cl.² H01J *9/50*
U.S. Cl. 316—2 1 Claim

1. In a method for devacuating an evacuated electron tube to atmospheric pressure, said tube comprising an envelope having a glass neck portion and, housed in said neck portion, a mount assembly including a surface structure opposite and closely spaced from an area of said neck portion,

said method including the step of directing a pulsed beam of radiant energy incident upon an external surface area of said glass neck portion until a crater is formed in said neck portion and the glass material at the bottom of said crater volatilizes and is swept into said envelope and condenses therein; the improvement comprising

applying said beam to an area of said neck portion that is opposite and closely spaced from said surface structure

comprising said mount assembly so that volatilized material that is swept into said tube condenses on and sticks to



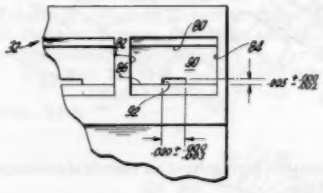
said surface structure of said mount assembly, said surface structure being spaced no further than 250 mils from the inner surface of said glass neck portion.

4,010,992

LOW PROFILE SOCKET HAVING TERMINAL PINS SEALINGLY MOUNTED IN SOCKET HOUSING

David J. Crimmins, Stockton, and William Y. Sinclair, Frenchtown, both of N.J., assignors to Aries Electronics, Inc., Frenchtown, N.J.

Filed Jan. 8, 1976, Ser. No. 647,425
Int. Cl.² H01R *13/12*
U.S. Cl. 339—17 CF **12 Claims**



1. A socket for receiving an electronic multi-pin package comprising an elongated housing having the plurality of channels extending therethrough and a plurality of terminals;

each terminal including (1) a post portion received within a respective one of said channels and extending from one side of the housing, and (2) a receptacle portion disposed within said respective channel for engaging a pin of said multi-pin package;

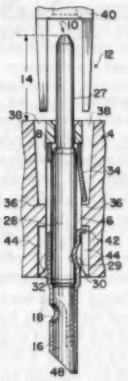
each said channel in said housing defined by (1) rigid upstanding wall portions for engaging the sides of said receptacle portion of the terminal, and (2) a flexible membrane base having an aperture therein, with the cross-section of said aperture being less than the cross-section of said terminal post portion whereby, when the terminal post portion is fully assembled in said channel, the membrane base thereof deforms downwardly to sealingly engage the terminal.

4,010,993

ELECTRICAL CONNECTOR DEVICE

Reiner Mathias Hohenberger, Brackenheim, and Gerd Johann Emil Holst, Loewenstein, both of Germany, assignors to Bunker Ramo Corporation, Oak Brook, Ill.

Continuation of Ser. No. 410,059, Oct. 26, 1973, abandoned, which is a continuation of Ser. No. 333,553, Feb. 20, 1973, abandoned, which is a continuation of Ser. No. 142,876, May 13, 1971, abandoned. This application Feb. 28, 1975, Ser. No. 554,331
Int. Cl.² H01R *27/00*
U.S. Cl. 339—31 R **5 Claims**



1. An electrical connector device which may be used either as a female connector device or as a male connector device, said electrical connector device comprising:

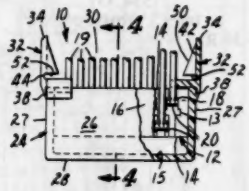
a body of insulating material having a passageway extending from a front end to a rear end and including an outwardly formed stop means between said ends; and

a one-piece metallic sleeve located at least partially within said passageway and having outwardly extending resilient means cooperating with said stop means for positioning said sleeve in said passageway, the sleeve having front and rear end portions and contact means interconnecting said end portions, said contact means bowed inwardly to resiliently contact a projecting end portion of a first male contact element of a mating connector when such element is inserted into said sleeve in a direction from the front end of said passageway toward the rear end thereof with said contact means then acting as a female connector device, and said contact means also being outwardly expandible to alternatively engage and support an enlarged rear portion of a second male contact element constituting an adapter converting said sleeve from a female contact to a male contact when the combination of said sleeve and said second male contact element is inserted in said passageway in the opposite direction from the rear end thereof toward the front end thereof, said contact means receiving the second male contact element in a position where the smaller front portion of said second male contact element then extends outwardly from said body beyond the front end of said passageway, the sleeve including attachement means on said rear end portion for making electrical connection to an external conductor.

4,010,994
CONNECTOR ENCAPSULATING HOUSING

James E. Aysta, Stillwater, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 400,950, Sept. 26, 1973. This application June 12, 1975, Ser. No. 586,502
Int. Cl.² H01R 13/44
U.S. Cl. 339—36 7 Claims

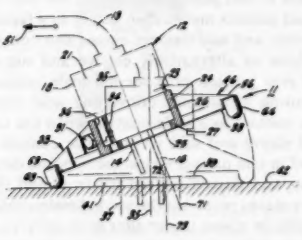


1. A housing for encapsulating an electrical connector having upstanding side walls extending between opposite ends and internal passageways through the connector between said opposite ends, said housing having walls defining a socket with an unrestricted open end and smooth inner side surfaces having dimensions adapted to conform to the side walls of a said connector entirely around the connector and receive the connector endways with a sliding fit sufficiently close that the passageways in the connector will offer less resistance to movement of the encapsulating material than the space between the inner side surfaces of the socket and the connector walls, a pair of levers, and means for hingedly mounting said levers at the open end of the socket in opposing relationship, each lever having an end spaced a first distance from said hinge means and adapted for manual engagement and a driving surface adjacent the open end of the socket spaced a distance less than said first distance from said hinge means and adapted to engage the exposed end of a said connector received in the socket, and being manually pivotable via said hinge means from a first position at which the open end of the socket is unrestricted toward a second position to engage its driving surface with the exposed end of a said connector received in the socket and drive the connector fully within the socket.

4,010,995
ELECTRICAL OUTLET GUARD

Robert H. Britschgi, 4515 Sierra View Way, Fair Oaks, Calif. 95826, and Jerry C. Frinzel, 5324 Tiburon Way, Sacramento, Calif. 95841

Filed Nov. 14, 1975, Ser. No. 631,888
Int. Cl.² H01R 13/62
U.S. Cl. 339—45 R 2 Claims



1. Electrical outlet guard comprising:

a. a central hub shaped to receive an electrical plug and orient the prongs of the plug into alignment with the slots of an electrical wall outlet when said guard is located against the wall in register with the outlet, said central hub being of hollow right circular cylindrical configuration, and means on said hub for releasably clamping said guard to the electrical plug;

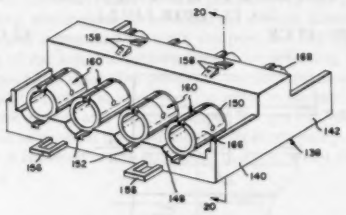
b. at least three circumferentially spaced limbs each mounted at one end on said hub said limbs being arrayed in radial fashion relative to the axis of said hub, at least one of said limbs being provided with a radial slot extending through the adjacent portion of said hub, said clamping means including means for urging the slot walls into closed position with the plug disposed within said hub for clamping engagement thereby as the slot is closed; and,

c. a leg mounted on the other end of each of said limbs, the ends of said legs normally contacting the wall surface externally of a cover plate of the wall outlet, said legs being spaced at a distance from said hub such that the prongs of the plug remain substantially in alignment with the wall outlet slots as said guard is tilted away from the wall in any direction with at least one of said legs serving as a fulcrum as the plug is withdrawn and the tips of the prongs are moved from a first engaged position in the outlet to a second position in which the prong tips disengage the outlet.

4,010,996
INTRINSIC CERTIFICATION ASSEMBLY TECHNIQUE FOR WIRING COMPONENTS INTO AN ELECTRICAL APPARATUS

John Root Hopkins, Belleair, Fla.; Robert Maurice Renn, and Robert Keith Southard, both of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 649,009, Jan. 14, 1976, which is a division of Ser. No. 520,399, Nov. 4, 1974, Pat. No. 3,970,354. This application Aug. 17, 1976, Ser. No. 715,096
Int. Cl.² H01R 25/00
U.S. Cl. 339—47 R 5 Claims



1. An improved hermaphroditic electrical connector assembly comprising:

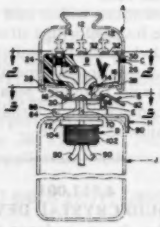
a connector housing having a main body portion with integral contact supporting portions extending from two opposite sides thereof, a plurality of contact receiving channels extending through said housing from one contact supporting portion to the other, each channel including a profiled groove in each of said contact supporting portions and a profile aperture in said main body portion,

a plurality of tubular contacts each having at least one longitudinal slot defining matable contact engagement areas and each said contact adapted to be received in a respective one of each of said contact passages of said connector housing, each said contact further including first means adapted to be received in said profiled groove to limit the axial movement of said contact and second means engageable with the profiled aperture in said main body portion preventing rotational movement of said contact about its longitudinal axis.

4,010,997
PLUG-IN JACK FOR ELECTRICAL BUSWAYS

William J. Bulanchuk, Pelham, N.Y., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Nov. 28, 1975, Ser. No. 636,040
Int. Cl.² H01R 7/28, 13/54
U.S. Cl. 339—75 R 17 Claims

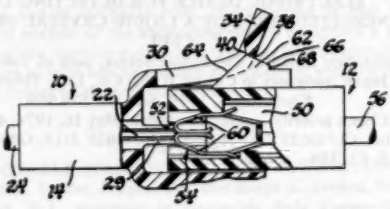


1. A plug-in jack for electrical busways or the like comprising; a generally T-shaped hollow housing of electrical insulating material including an enlarged hollow head portion having end walls and sidewalls and a substantially closed top end, said head portion having a width across said end walls substantially greater than its thickness across said sidewalls, a plurality of spaced-apart electrical contact buttons extending outwardly from said top end of said head portion, a hollow base portion opposite from said head portion and having attaching means thereon for attaching said base portion to a junction box or the like, said base portion being integrally formed and connected with a relatively narrow hollow neck portion which is integrally formed and connected with said head portion, said head portion, neck portion and base portion having hollow interiors communicating with one another for passage of wires therethrough for connection with said buttons, and releasable locking means carried by said housing intermediate said head and base portions for releasably locking said head portion in an opening.

4,010,998
MATABLE ELECTRICAL CONNECTOR MEANS WITH INERTIA LOCK

Emil J. Tolnar, Jr., Warren; Robert G. Plyler, Vienna, and David R. Heilman, Warren, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 26, 1976, Ser. No. 652,387
Int. Cl.² H01R 13/54
U.S. Cl. 339—91 R 5 Claims



1. Matable electrical connector means having lock means comprising

a first connector body of moldable insulating material having a given number of first longitudinal open ended terminal receiving cavities, each of which has a first terminal retained therein having a forward female portion,

a second connector body of moldable insulating material having a corresponding number of second longitudinal open ended terminal receiving cavities, each of which has a second terminal retained therein having a forward male portion,

one of said first and second connector bodies having a forward portion engaging a forward portion of the other of said connector bodies when said connector bodies are in a mated position whereat said first and second cavities are longitudinally aligned and said male portion(s) is received by said female portion(s) and biasingly engaged by resilient portions thereof,

said first and second terminals having a predetermined terminal engagement force resisting connection of said connector bodies produced by insertion of said male portion(s) in said female portion(s) during assembly,

one of said first and second connector bodies having integral cantilevered latch arm means and the other of said first and second connector bodies having protruding generally triangular locking ramp means which cooperate to lock said connector bodies in said mated position,

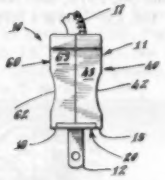
said latch arm means having free end portion means engaging said ramp means and being deflected outwardly thereby during assembly producing a maximum predetermined force resisting assembly of said connector bodies into said mated position, and

said ramp means being profiled and located on said other connector body such that during assembly said maximum predetermined force occurs prior to biased engagement of said male portion(s) by said female portion(s) and is about twice as great as said predetermined terminal engagement force.

4,010,999
DEAD-FRONT ELECTRICAL PLUG

Ernest Gerhard Hoffman, Middlefield, Conn., assignor to Harvey Hubbell Incorporated, Orange, Conn.

Filed Sept. 2, 1975, Ser. No. 609,797
Int. Cl.² H01R 13/58
U.S. Cl. 339—107 21 Claims



1. A dead-front electrical plug comprising:

A. a dead-front member comprising the front of the dead-front electrical plug;

B. at least two conductive blades mounted through and supported by said dead-front member, said blades including means for connecting wire conductors thereto;

C. a first side cover comprising one side and substantially one-half of the ends and top of the dead-front electrical plug in its assembled condition, said first side cover pivotally connected to said dead-front member by a web hinge integral with both said first side cover and said dead-front member, wherein said first side cover is pivotable between an open position affording access to said means for connecting wire conductors to said blades and a closed position partially enclosing said means for connecting wire conductors to said blades;

D. a second side cover comprising another side and substantially the other half of the ends and top of the dead-front electrical plug in its assembled condition, said second side cover pivotally connected to said dead-front member opposite to said first side cover by a web hinge integral with both said second side cover and said dead-front member, wherein said second side cover is pivotable between an open position affording access to said means

for connecting wire conductors to said blades and a closed position fully enclosing, together with said first side cover, said means for connecting wire conductors to said blades;

E. means for securing said side covers together to maintain the dead-front plug in its assembled condition fully enclosing said means for connecting wire conductors to said blades;

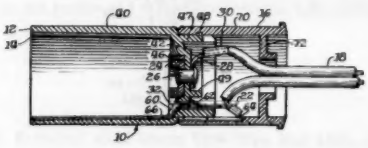
F. at least one first member laterally protruding from one of said dead-front member or said first side cover near the web hinge connecting them, and at least one opening defined in the other of said dead-front member or said first side cover near the web hinge connecting them for receiving said first laterally protruding member in mating interengagement when the electrical dead-front plug is in its assembled condition, whereby said first laterally protruding member bears longitudinal stress between said first side cover and said dead-front member in at least one longitudinal direction and protects said web hinge from such longitudinal stress; and

G. at least one second member laterally protruding from one of said dead-front member or said second side cover near the web hinge connecting them, and at least one opening defined in the other of said dead-front member or said second side cover near the web hinge connecting them for receiving said second laterally protruding member in mating interengagement when said dead-front electrical plug is in its assembled condition, whereby said second laterally protruding member bears longitudinal stress between said second side cover and said dead-front member in at least one longitudinal direction and protects said web hinge from such longitudinal stress.

4,011,000
ELECTRICAL RECEPTACLE

Richard F. Wharton, Chicago, Ill., assignor to Marquis Industries, Inc., Chicago, Ill.

Filed June 30, 1975, Ser. No. 591,773
Int. Cl.² H01R *17/18*
U.S. Cl. 339—130 C **3 Claims**



1. An electrical receptacle for use with a plug of the type having a first spring-loaded contact member at the center of one end, and a second spring-loaded contact member on one side;

said electrical receptacle comprising a housing, a sleeve within said housing, a center contact member, and first and second terminal members affixed respectively to said center contact member and to said sleeve;

said housing being of insulating material with an opening forming a well and having a bottom portion at one end of said well, said well having a generally cylindrical side wall which is tapered with the diameter at the bottom slightly smaller than the diameter at the top open end, said bottom portion having a center opening surrounded by a short cylindrical depression which in turn is surrounded by a surface sloping upward from the depression to the bottom of the side wall, and a side opening through which said second terminal member extends;

said first terminal member having a ring at one end; said center contact member being a cup-shaped metal member which fits in said depression, having a hole in its center, and shaped to receive said first spring-loaded contact member of said plug; fastening means extending in order through said hole in the center contact member, said center opening of said housing, and said ring of the first terminal member to thereby affix both the center contact member and the first terminal member to the housing;

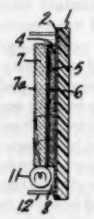
said sleeve being of relatively thin, smooth metallic material formed into only a cylinder with an open seam parallel to the axis, and inserted with a close fit within said well adjacent said side wall;

the shape and dimensions within said well being such that said plug may be inserted with a straight motion with said first spring-loaded contact member entering said cup-shape of said center contact member and being compressed against said fastening means, and said second spring-loaded contact member sliding along and being compressed against said sleeve.

4,011,001
LIQUID CRYSTAL DEVICE

Tokio Moriya, Chiba, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Mar. 14, 1975, Ser. No. 558,461
Claims priority, application Japan, Mar. 15, 1974, 49-29744
Int. Cl.² G02F *1/01*; G04B *19/30*
U.S. Cl. 350—160 LC **6 Claims**

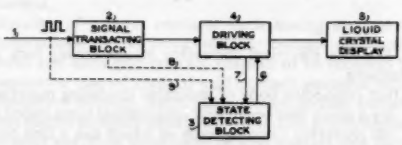


1. A liquid crystal device for use in watches and the like comprising: first and second transparent base plates disposed in superposed spaced-apart relationship; a liquid crystal element sandwiched between said first and second base plates; means defining a recess in the peripheral side edge of said second base plate and said liquid crystal element; a light source disposed within said recess for illuminating said liquid crystal element; and means for directing light emitted from said light source toward said liquid crystal element.

4,011,002
ELECTRONIC DEVICE FOR DETECTING THE ENERGIZED STATE OF A LIQUID CRYSTAL DISPLAY CELL

Heihachiro Ebihara, and Fukuo Sekiya, both of Tokorozawa, Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed May 6, 1975, Ser. No. 574,969
Claims priority, application Japan, May 16, 1974, 49-53881
Int. Cl.² G02F *1/18*; G08B *5/36*; G02F *1/13*; G08B *5/22*
U.S. Cl. 350—160 LC **7 Claims**



1. An electronic device comprising:

a logic circuit for producing an alternating current signal,

a liquid crystal display cell,

a driving circuit for supplying a driving signal to said display cell in accordance with the output signal from said logic circuit,

a detecting circuit for monitoring the energized state of said display cell, said detecting circuit producing an output when the display cell is energized by direct current, and

means for changing the energized state of said display cell to a deenergized state of said display cell in accordance with the output signal from said detecting circuit.

4,011,003

ELECTROMAGNETICALLY CONTROLLABLE PIVOTING MIRROR DEVICE

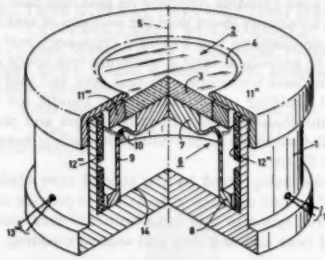
Jan Cornelis Willem Dragt, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 26, 1976, Ser. No. 652,535

Claims priority, application Netherlands, Mar. 10, 1975, 7511634

Int. Cl.² G02B *27/17*; G05D *25/00*

U.S. Cl. 350—6 **2 Claims**



1. An electromagnetically controllable pivoting mirror device for causing a reflecting surface to pivot about pivotal axes parallel to the reflecting surface under the influence of electrical control signals, more particularly destined for both radially and tangentially following the information track of a rotating optically readable video disc with the aid of a light spot produced by a light source, and comprising:

a frame,

a mirror which relative to the frame is pivotable about the said pivotal axes, which mirror comprises a base with a reflecting surface on one side thereof,

supporting means for pivotably supporting the mirror on the frame and comprising a first portion which is connected to the mirror and a second portion which is connected to the frame as well as a third elastically deformable intermediate portion of an elastic plastic, and

electromagnetic control means comprising permanent magnets and/or electrical coils, characterized in that said third portion of the supporting means comprises a substantially rotation-symmetrical bellows body, which comprises at least one fold which is concentric with the optical center of the reflecting surface.

4,011,004

PIVOTABLE STAGE FOR MICROSCOPE SYSTEM

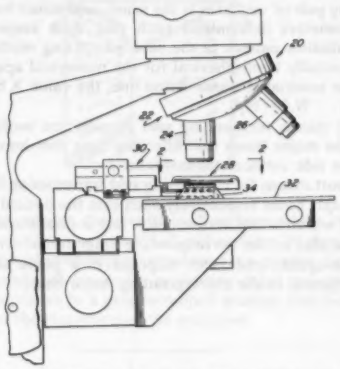
Marshall S. Levine, Wayne, Pa., and Ralph Z. Jorden, Pennsauken, N.J., assignors to Geometric Data Corporation, Wayne, Pa.

Filed Feb. 6, 1975, Ser. No. 547,685

Int. Cl.² G02B *21/24*

U.S. Cl. 350—90 **1 Claim**

1. In a microscope system, a stage for holding a slide under a microscope, said stage including a movable support member, a slide holder for engaging a slide, said slide holder secured to said movable support member by a pivotable member which is rotatable about a horizontal axis, means for moving said movable member in at least two rectilinear directions, said slide holder being movable with said movable support member so that a slide held thereby is movable in two rectilinear directions in a plane substantially transverse to the optical axis of said system, a condenser disposed in the optical axis of said system, said condenser including a point-like projection which extends upwardly from the top of the condenser, said slide holder including a slidable member and fixed projection, means on said slide holder for resiliently urging said slidable



member against said slide so that said slide is held by said slide holder between said slidable member and said projection, said slide holder and slide being disposed with respect to said condenser so that said slide rests on said point-like projection and is slidably supported thereon so that the bottom surface of said slide in the optical axis of said microscope system remains substantially fixed longitudinally of said optical axis as said slide is moved transversely with respect thereto.

4,011,005

COUPLER FOR OPTICAL COMMUNICATION SYSTEM

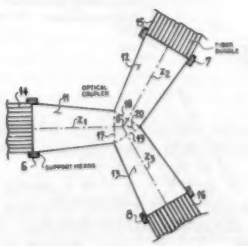
Thaddeus Hawkes, and Jean-Claude Reymond, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Jan. 19, 1976, Ser. No. 650,263

Claims priority, application France, Jan. 22, 1975, 75.01971

Int. Cl.² G02B *5/16*

U.S. Cl. 350—96 C **11 Claims**



1. An optical coupler for interconnecting transmission lines in an optical communication system having at least three optical signal transmission lines each comprising at least one optical waveguide having a core of transparent material having a refractive index N1 surrounded by a layer of transparent cladding material having a refractive index N2 that is lower than N1, said coupler coupling the signal in any one of said optical transmission lines to all of the remaining optical signal transmission lines and comprising:

a propagation medium of transparent material of refractive index N3, formed by at least three elongated frusto-conical shaped arms, each having an outer side surface and

two planar end faces namely a major base and a minor base which are substantially perpendicular to the longitudinal axis thereof and a connecting medium for mutual optical interconnection of the said minor bases and for mechanical holding of said arms, said longitudinal axes meeting at a common point situated in the said connecting medium which is comprised between said minor bases, said arms being symmetrically disposed with respect to the said common point so that the angle between any pair of said axes is the same, said minor bases having diameters determined such that their respective light radiation pattern in the said connecting medium is substantially hemispherical for the numerical aperture A of the associated transmission line, the value A being equal to $N_1^2 - N_2^2$,

layer means surrounding said propagation medium except said major bases for reflecting light that impinges upon the side surfaces thereof, and

support means for connecting said transmission lines to said major bases respectively such that the optical waveguide of which a said transmission line is comprised terminate parallel to the corresponding longitudinal arm axis with waveguide end faces disposed in a plane substantially adjacent to the corresponding major base.

4,011,006

GeO_2-B_2O_3-SiO_2 OPTICAL GLASS AND LIGHTGUIDES

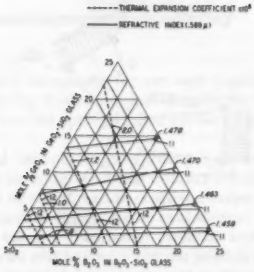
James William Fleming, Jr., Piscataway; Raymond Edward Jaeger, Basking Ridge, and Thomas John Miller, Green Brook, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 509,652, Sept. 26, 1974, Pat. No. 3,954,431. This application Dec. 17, 1975, Ser. No. 641,651

The portion of the term of this patent subsequent to May 4, 1993, has been disclaimed.

Int. Cl.² C03C *3/08*; G02B *5/14*

U.S. Cl. 350—96 M **3 Claims**



2. A light guide for transmitting light along a transmission path comprising a first glass which is the core in contact with a second glass which is the cladding along the transmission path CHARACTERIZED IN THAT the first glass is composed of from 8 mole percent to 40 mole percent GeO_2, remainder SiO_2, and the second glass is composed of from 5 mole percent to 40 mole percent B_2O_3, from 0.1 to 5 mole percent GeO_2, remainder SiO_2, so that the first glass and the second glass differ in index of refraction by more than one half percent and differ in coefficient of linear expansion by less than 20 percent.

4,011,007

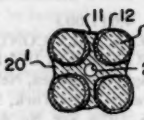
OPTICAL FIBER BUNDLE IMAGE CONDUIT

Roland A. Phaneuf, Sturbridge, and Richard R. Strack, Southbridge, both of Mass., assignors to American Optical Corporation, Southbridge, Mass.

Continuation of Ser. No. 157,217, June 28, 1971, abandoned. This application Dec. 27, 1973, Ser. No. 428,967

Int. Cl.² G02B *5/16*

U.S. Cl. 350—96 BC **4 Claims**



1. A drawn bundle of optical fibers comprising:

a plurality of cores of selected material and dimension;

a first core cladding having a refractive index providing substantially total internal reflection within said cores;

a second core cladding disposed on said first core cladding having a viscosity lower than the viscosity of said core and first core cladding and having a cross-sectional area selected to provide at least a minimum free space of cross-sectional area unoccupied by said core and said first and second cladding within said drawn bundle for substantially eliminating optical fiber blemishes and preventing fiber distortion while providing channeling between the optical fibers;

said bundle being fused by the second core cladding deformed by said drawing to an extent to provide said minimum free space in said cross-sectional area unoccupied by said core and said first and second cladding.

4,011,008

DISPLAY DEVICE COMPRISING A LAYER OF LIQUID CRYSTAL

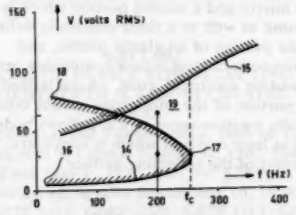
Cornelis Jan Gerritsma, and Wilhelmus Hendrikus de Jeu, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 12, 1974, Ser. No. 460,355

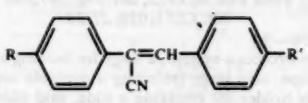
Claims priority, application Netherlands, Apr. 18, 1973, 7305413

Int. Cl.² G02F *1/13*

U.S. Cl. 350—160 LC **4 Claims**



1. A display device comprising a mixture of a nematic liquid crystal having a negative dielectric anisotropy $\Delta\epsilon < -1 (\Delta\epsilon = \epsilon_{\parallel} - \epsilon_{\perp})$ and being a stilbene of the formula:



where R and R' are each alkyl, alkoxy or acyloxy of up to 8 carbon atoms with the proviso that R and R' do not both

represent methyl or methoxy and an optically active material between two supporting plates provided with electrodes, said nematic liquid crystal exhibiting light scattering properties below a critical frequency when a voltage is supplied to at least two of said electrodes in a first range of voltages between a first frequency dependent minimum and a frequency dependent maximum of said voltage as well as in a second range of voltages above a second frequency dependent minimum of said voltage, said nematic crystal being transparent when subjected to a voltage between said frequency dependent maximum and said second frequency dependent minimum in a range of frequencies said second frequency dependent minimum being higher than said frequency dependent maximum, means for supplying recording and erasing voltages having the same frequency in said range of frequencies to at least two of said electrodes, said recording voltage being between said first minimum and said maximum of said voltage and said erasing voltage being between said maximum and said second minimum of said voltage.

4,011,009

REFLECTION DIFFRACTION GRATING HAVING A CONTROLLABLE BLAZE ANGLE

William L. Lama, Webster; Ned J. Seachman, Penfield, both of N.Y., and Clark I. Bright, Arcadia, Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed May 27, 1975, Ser. No. 580,654
Int. Cl.² G02B *5/18*; G02F *1/19*
U.S. Cl. 350—162 R **11 Claims**

1. A blazed reflection diffraction grating comprising:
a first electrode coupled to a substrate material;
an elastomeric material coupled to said first electrode, said elastomeric material deformable upon application of an electric field thereto; and
a second electrode coupled to said elastomeric material, said second electrode coupled to a surface of said material positioned opposedly to said first electrode, said second electrode comprising an optically reflecting material, at least a part of said second electrode becoming a multiplicity of generally uniform planar regions upon application of a periodic electric field having a repeating sawtooth profile between said first and said second electrode, wherein said planar regions are substantially parallel and inclined at substantially a constant angle to said first electrode after said application of a periodic electric field.

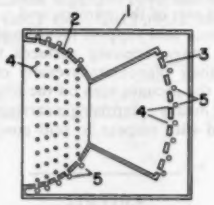
4,011,010

VISUAL FIELD TESTER WHICH IS ENTITLED MULTISCALE PERIMETER

Allen L. Cohen, 9677 Basket Ring Road, Columbia, Md. 21045

Filed Feb. 18, 1976, Ser. No. 659,092
Int. Cl.³ A61B *3/02*
U.S. Cl. 351—24 **2 Claims**

1. Apparatus for testing both the peripheral and central fields of vision of the human eye, which includes a hemispherically shaped testing surface for peripheral field testing, and at least one more testing surface substantially spaced from said hemispherical surface, said testing surfaces being spaced from each other by flared-shaped spacing means, said surfaces being joined in such a manner such that for n testing surfaces,



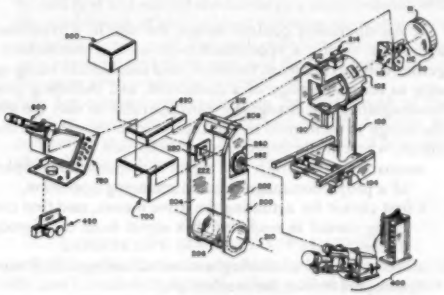
where n is an integer, there exists n -1 surfaces whose central area is open so as to expose all of said surfaces to view, with the more central surface portions always at a greater distance from view, and with means for presenting visual targets upon the testing surfaces in a predetermined manner and location according to the discretion of the examiner.

4,011,011

OPTICAL PROJECTION APPARATUS

Harold S. Hemstreet, Wilton; David A. Markle, Norwalk, both of Conn.; William H. Newell, Mount Vernon, N.Y., and Abe Offner, Darien, Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Division of Ser. No. 339,860, March 9, 1973, abandoned. This application Dec. 19, 1974, Ser. No. 534,465
Int. Cl.² G03B *27/32*
U.S. Cl. 355—18 **8 Claims**



1. Apparatus for photographically exposing an image-receiving surface to a light image of an object, said apparatus comprising:
a concave mirror,
a convex mirror of smaller radius of curvature with its center of curvature substantially at the center of curvature of the concave mirror,
means for supporting an object surface and an image-receiving surface with respect to each other and with respect to said mirrors so as to optically define a common image and optical plane,
said optically defined common image and optical plane being located a distance from the concave mirror substantially equal to the radius of curvature thereof,
said optically defined common image and optical plane containing the centers of curvature of said mirrors, and the perpendicular to the optically defined common image and optical plane through said centers of curvature constituting an axis of said mirrors,
means for illuminating an arcuate area at the site of the

object surface which forms an arcuate light image area at the site of the imagereceiving surface,

said arcuate area at the site of the object surface and said arcuate light image area at the site of the image-receiving surface optically defining, on the optically defined common image and optical plane, arcuate images respectively having arcuate areas exterior of and substantially centered on said axis of the mirrors, and

means to advance said support means and the sites of the object and image-receiving surfaces to be supported thereon in their planes transversely of the means for illuminating the arcuate area on the object surface,

said advancing means comprising a carriage rotatable about an axis fixed with respect to said concave and convex mirrors.

4,011,012
OPERATION CONTROL DEVICE FOR COPYING APPARATUS

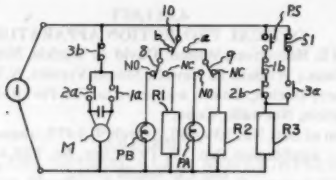
Yoshihisa Kawai, Aichi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 19, 1975, Ser. No. 579,111

Claims priority, application Japan, May 31, 1974, 49-63340[U]

Int. Cl.² G03B 27/52

U.S. Cl. 355—55 **10 Claims**



1. An operation control device for use in a reproducing apparatus having a reproduction-projection mechanism together with drive means therefor, said mechanism being operable to form an image of a document, and including projectionmagnification changing means operable to vary the size of the image to be formed by the reproduction-projection mechanism, wherein the improvement comprises:

means for producing a first signal in response to completion of a projection-magnification changing operation,

a first circuit for actuating the drive means, said first circuit being closed in response to a signal from the signalproducing means,

a second signal-producing means indicating completion of an operation of the mechanism,

a second circuit for actuating the projection-magnification changing means, said second circuit being closed in response to completion of an operation by the reproduction-projection mechanism, and

a manual control and memory means associated with said first circuit, said memory means being settable to a discrete state indicative of an operation of the manual control and said changing means being actuated in response jointly to the discrete state of the memory means and the signal from said second signal-producing means,

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4,011,013
MULTIFREQUENCY EXCITATION OF GAS ROTATIONAL SPECTRA

Joseph John Barrett, Morris Plains, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Apr. 21, 1975, Ser. No. 569,894

Int. Cl.² G01J 3/44; G01B 9/02

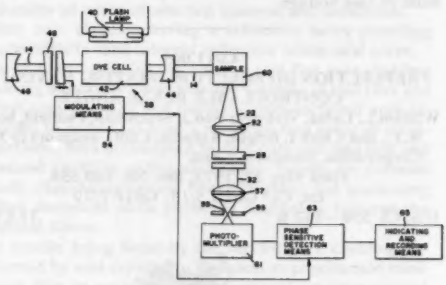
U.S. Cl. 356—75 **20 Claims**

1. An apparatus for spectroscopically analyzing gas comprising:

a. radiation source means for generating a plurality of spatially superimposed beams of monochromatic radiation;

b. tuning means for adjusting the frequency difference between radiation beams of adjacent frequency to equal substantially an odd integral submultiple of the frequency difference between adjacent spectral components of the periodic spectrum for a preselected constituent of gaseous material;

c. projecting means for directing said radiation beams through said gaseous material to produce scattered radiation, the scattered radiation produced by each of said radiation beams having spectral components periodic in frequency and the spectral components for said preselected constituent being superimposed to form, within the spectrum produced by combined scattering of said radiation beams, the periodic spectrum for said preselected constituent;



d. primary interferometric means adapted to receive said scattered radiation for selectively separating said periodic spectrum therefrom and transmitting said periodic spectrum in the form of a detectable signal, said primary interferometric means having interference-producing means for providing a plurality of transmission windows regularly spaced in frequency, the frequency spacing between adjacent windows being adjusted to equal substantially the frequency differences between radiation beams of adjacent frequency; and

e. frequency shifting means associated with said tuning means for displacing the frequencies of said radiation beams relative to the frequencies of said transmission windows so that the frequency of a given radiation beam is located substantially half-way between adjacent transmission windows of said primary interferometric means, whereby said detectable signal is a fringe derived from the superimposed spectral lines of said periodic spectrum and having an intensity substantially equal to their sum.

4,011,014
POLARIZATION ROTATION ANALYZER

George A. Tanton, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 8, 1974, Ser. No. 449,407

Int. Cl.² G01J 4/04

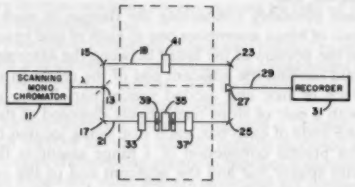
U.S. Cl. 356—116 **3 Claims**

1. An analyzer of polarization rotation by translucent specimens, comprising:

a spectrometer with a selective frequency monochromator and a recorder with optical means therebetween for establishing and converging parallel light beams from said monochromator; and,

a comparator including a polarizer, a supported specimen position, and an analyzer sequentially disposed in the path of one of said beams, said analyzer being adjustable to equal and opposite settings for modification of the

intensity of the beam passing through a rotary power translucent specimen to compensate for specimen absorption and reflection and said recorder being disposed



to provide outputs in logarithmic proportion to the ratios of light intensity of said parallel beams to determine the poiarization rotation by the specimen.

4,011,015

REFRACTOMETRIC DENSITOMETER

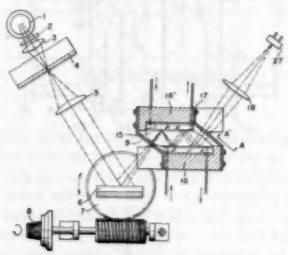
Nobuyuki Baba, Shin-nanyo, Japan, assignor to Toyo Soda Manufacturing Co., Ltd., Yamaguchi, Japan

Filed Sept. 29, 1975, Ser. No. 617,509

Claims priority, application Japan, Mar. 25, 1975, 50-35806

Int. Cl.² G01N *21/46*

U.S. Cl. 356—136 **6 Claims**



1. A refractometric densitometer comprising:

a first packing element and a first gasket disposed at one side of a glass element,

a second packing element and a second gasket disposed at the other side of the glass element,

a groove for passage of a reference material and a groove for passage of a sample respectively formed in the first and second packing elements,

an inlet pipe and an outlet pipe formed in the first and second gaskets for passing the reference material or the sample to the grooves,

means for connecting the outlet pipe of the first gasket to the inlet pipe of the second gasket, and

means for imparting multiple reflection to an incident light from the part of the glass element between the faced surfaces of the glass element contacting the first and second packing elements.

4,011,016

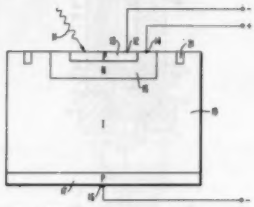
SEMICONDUCTOR RADIATION WAVELENGTH DETECTOR

Charles R. Layne, Orlando, and M. William Ford, Maitland, both of Fla., assignors to Martin Marietta Corporation, New York, N.Y.

Continuation of Ser. No. 465,652, April 30, 1974, abandoned. This application Sept. 23, 1975, Ser. No. 616,115

Int. Cl.² G01J *3/46*; H01J *39/12*; H01L *27/14*

U.S. Cl. 356—195 **10 Claims**



1. A semiconductor wavelength detector for determining the wavelength of incident monochromatic electromagnetic radiation whose wavelength is variable within a specified range comprising:

a first semiconductor photodiode having an active region with a thickness and absorption coefficient such that it absorbs substantially all the photon energy of the shortest wavelength in said range, but which transmits an increasing amount of photon energy as the wavelength increases until substantially all of the longest wavelength in said range is transmitted;

a second semiconductor photodiode monolithically formed with said first diode and having an active region which is thicker than that of said first photodiode and which absorbs substantially all of the photon energy transmitted by said first diode, the proportion of photon energy absorbed by said first and second diodes varying in accordance with the wavelength of the incident radiation throughout said specified range; said incident radiation being directed only onto said first diode, and said diodes being formed in the same semiconductor material; and

means for continuously measuring the wavelength of the incident radiation throughout said specified range by comparing the changes in photoconductivity of both said photodiodes as the wavelength varies.

4,011,017

BORESCOPE SUPPORT APPARATUS

Roger F. Feuerstein, Schenectady; Maurice A. Freeman, Burnt Hills, and Leonardo B. Spinelli, Albany, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 523,431, Nov. 13, 1974, Pat. No. 3,917,432. This application July 16, 1975, Ser. No. 596,377

Int. Cl.² G01N *21/16*, *21/32*

U.S. Cl. 356—241 **5 Claims**

1. An apparatus for supporting a borescope probe, said borescope probe being of the type having an elongated, generally cylindrical stem portion which projects through an opening in an outer casing, said apparatus comprising:

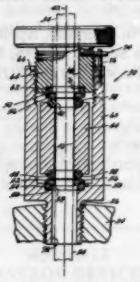
a housing;

at least one resiliently deformable washer formed with an annular opening therethrough sized, in a non-deformable condition, to slideably receive said stem portion in close fitting relationship therewith;

spherical bearing means abutting said resilient washer for providing swivelling movement of said resilient washer, said bearing means formed with an opening therethrough which is generally axially aligned with the resilient washer opening and is sized to permit the borescope stem portion to freely pass therethrough; and;

a locking collar carried by said housing, said locking collar

being movable between a first position wherein said borescope stem portion is free to slide along and rotate about its axis and said bearing means are free to swivel and a



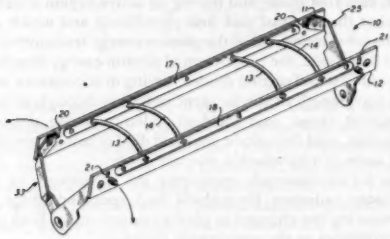
second position wherein said resilient washer is resiliently deformed into gripping engagement with said borescope stem portion and said bearings are frictionally locked against further swivelling motion.

4,011,018

LOOSE LEAF BINDER

Billy J. Doolittle, Springfield, Mo., assignor to Royal Business Machines, Inc., Springfield, Mo.

Filed Sept. 10, 1975, Ser. No. 612,199
Int. Cl.² B42F *13/12, 13/20*
U.S. Cl. 402—44 **1 Claim**



1. A linking arms mechanism for a prong type binder comprising:

first and second elongated, longitudinally extending, substantially flat and planar spacer bars, said spacer bars being disposed in spaced apart, parallel relationship;

each of said spacer bars being provided intermediate the side edges thereof with an elongated recess extending longitudinally over a major portion of the length of each bar, said recesses each terminating short of the respective opposite ends of the related bar;

each of said recesses being defined by a portion of the related spacer bar being laterally offset toward the other spacer bar to thereby provide the base of said recess;

a first set of spaced, curved binding prongs each having one end thereof connected to and within the recess of said first spacer bar;

a second set of spaced, curved binding prongs each having one end thereof connected to and within the recess of said second spacer bar;

a pair of hinge assemblies each respectively provided at the respective opposite ends of said spacer bars, and interconnecting said spacer bars for movement toward and away from each other;

the base of each recess being provided with holes arranged to receive the free ends of the prongs of the other spacer bar when the linking arms mechanism is closed;

each of said hinge assemblies comprising:

two leaves pivotally interconnected to each other at one of their ends for pivotal movement in the plane of said leaves;

a flange connected to the terminal end of each of said leaves; and

means pivotably connecting the flanges of each of said pair of hinge assemblies one to each of said spacer bars, at the portion of the latter between the extreme end of said bar and the adjacent end of the recess in said bar; each of first and second spacer bars being provided with a pair of stops respectively disposed at the opposite ends of each bar, each stop being located between the pivotal connection of a hinge assembly flange to said spacer bar and the adjacent end of the recess in said spacer bar; said stops being shear formed within said spacer bars and being cooperable with the terminal end of each of said flanges to limit pivotal movement of the latter relative to said spacer bar in the open position of said mechanism; and

means for releasably and latchably coupling one of said spacer bars to a loose leaf binder cover;

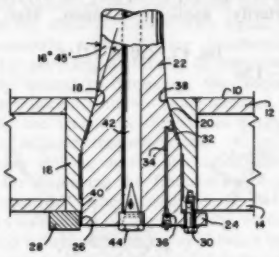
whereby said recesses shield the connections of said prongs to the spacer bars and the free ends of said prongs, and also provide more easily manually graspable structure for opening and closing operation of said linking arms mechanism.

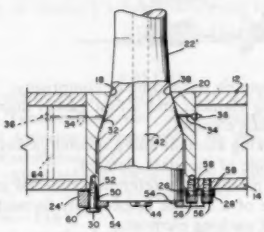
4,011,019

ADJUSTABLE AND DISENGAGABLE EARTH RAISE BORER STEM

Michael C. McDonald, Auburn, and Charles R. Dively, Seattle, both of Wash., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Jan. 16, 1976, Ser. No. 649,850
Int. Cl.² F16D *1/00;* **F16L** *17/00, 29/00*
U.S. Cl. 403—15 **12 Claims**





1. An arrangement replaceably coupling the stem of an earth raise borer to the cutterhead thereof, comprising:

first and second surfaces formed on a stem and cutterhead, respectively, which cooperate to define a slidingly-engageable interference fit therebetween, to effect a mutual, coupling engagement of said stem and cutterhead; and

means for engaging both said stem and cutterhead for fastening said stem and cutterhead together, retentively, in such an interference-fit coupling arrangement; further including

rotary torque-receiving means carried by one of said stem and cutterhead; and

rotary torque-transmitting means also carried by one of said stem and cutterhead for contacting engagement with said torque-receiving means for transmitting stem rotary torque to said cutterhead; wherein

said torque-receiving means comprises a plurality of lugs, each thereof having a lateral, radially disposed surface;

said torque-transmitting means comprises a like plurality of wall elements, each thereof arranged for contacting engagement with said lateral, radially disposed surface of one of said lugs; and

said lugs are adjustably displaceable relative to said cutterhead for movement of said lateral, radially disposed surfaces thereof into and out of proximity to said wall elements.

4,011,020

TRANSFER JOINT FOR RIGID FRAMES

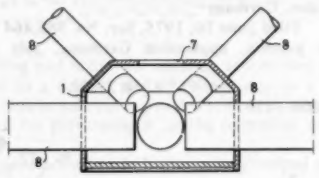
Erich Frantl, Gablenzgasse 24, A-1160 Vienna; Peter Hofstätter, Kollergerngasse 6, A-1060 Vienna, and Willibald Zemler, Ospelgasse 34, A-1200 Vienna, all of Austria

Filed Feb. 13, 1975, Ser. No. 549,797

Claims priority, application Austria, Feb. 20, 1974, 1398/74

Int. Cl.² F16B *7/00*

U.S. Cl. 403—172 **17 Claims**



1. A transfer joint for rigid frames comprising:

a solid joint member including a hollow metal casing having a wall with an outer surface which is substantially convex and an inner surface which is substantially concave, said casing being filled with a hardened grout material, said casing having a rigid connection with said hardened grout material, said casing having a plurality of substantially two-dimensional openings extending through said wall thereof;

at least three longitudinal bars extending into said casing, one each through a respective one of said openings, toward a common point of intersection within said casing, each of said bars having a portion within said casing embedded in said hardened grout material, the cross-sectional area of each of said bars at the area thereof passing through said wall of said casing being substantially undiminished from the cross-sectional area thereof exterior said casing, and each of said bars having an end portion within the interior of said casing which has at least some surface areas diverging from the longitudinal direction of said bar; and

a grout addition hole, extending through said wall of said casing, said grout addition hole being located to provide a free and unrestricted path to the ends of said longitudinal bars.

4,011,021

COMPENSATORY JOINT

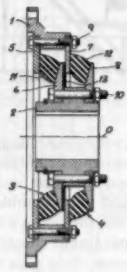
Helmut Hartz, Hedwigstrasse 24, Wanne-Eickel, Germany (4680)

Filed Sept. 12, 1975, Ser. No. 612,809

Claims priority, application Germany, Sept. 13, 1974, 2443804

Int. Cl.² F16G *11/00*

U.S. Cl. 403—220 **9 Claims**



1. A joint for interconnecting a driving member and a driven member with limited relative peripheral and radial mobility, comprising:

rigidly interconnected, axially spaced first and second coaxial annular plates securable to one of said members;

a third annular plate bracketed by said first and second annular plates and securable to the other of said members;

a friction coupling separating said second and third annular plates from each other; and

an elastic ring interposed between said first and third annular plates and positively connected therewith for transmitting torques therebetween and for axially pressing said friction coupling into contact with said second annular plate.

4,011,022

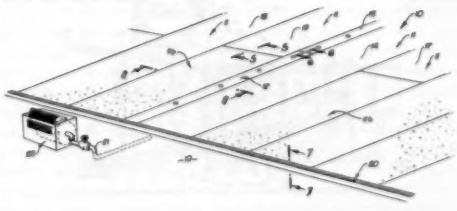
SELF-DRAINING VEHICULAR SUPPORTING PANEL AND STRUCTURE

Lloyd G. Welty, 410 S. Beverly Drive, Beverly Hills, Calif. 90212

Filed Dec. 3, 1975, Ser. No. 637,201

Int. Cl.² E01C *5/22*

U.S. Cl. 404—40 **9 Claims**

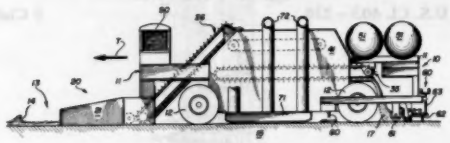


5. A panel as defined in claim 4, in which said body portion includes a plurality of longitudinal ribs between and parallel to said side plates and spaced therefrom and from each other to form a plurality of said longitudinal channels.

4,011,023
ASPHALT PAVEMENT RECYCLING APPARATUS

Earl F. Cutler, Lawrence, Kans., assignor to Cutler Repaving, Inc., Lawrence, Kans.

Filed Dec. 15, 1975, Ser. No. 640,444
Int. Cl.² E01C 23/12
U.S. Cl. 404—91 21 Claims

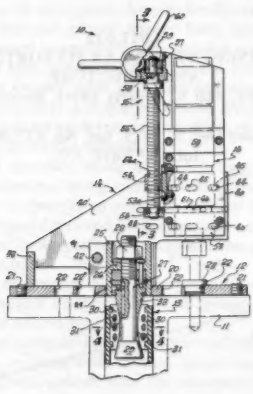


1. Equipment for recycling macadam pavement, comprising pickup means for removing crumbled macadam pavement material from a roadbed site, first and second heater means for heating the removed and crumbled pavement material, transport conveyor means including a first conveyor reach for conveying crumbled pavement material in a first direction past the first heater means, drop area means for dropping the crumbled pavement material from the first conveyor reach, thereby tumbling and agitating the crumbled pavement material, and a second conveyor reach for conveying the crumbled, agitated pavement material in a second direction of travel opposite the first direction of travel in an extended serpentine path past the second heater means for further heating, applicator means located in the drop area means for applying liquid asphalt to the heated, tumbling crumbled pavement material in the drop area means, and spreader means for applying the crumbled pavement and asphalt mix to the original roadbed site.

4,011,024
DRILLING MACHINE

Gregory Nakano, Pearl City; Stephen Orillo, Jr., Wahiawa; Tadao Uyetake, Pearl City, and Teikichi Higa, Honolulu, all of Hawaii, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 4, 1976, Ser. No. 655,182
Int. Cl.² B23B 45/14
U.S. Cl. 408—79 5 Claims



1. An apparatus for drilling holes in a pipe boss flange comprising:

a disk shaped mounting plate provided with a concentric projection having an axial bore and shaped for abutting the surface of the pipe boss flange having a plurality of openings therethrough;

means including a plurality of blades arranged in a cylinder with their longitudinal axis being mutually parallel, a resilient element bonding the blades together in their cylindrical configuration and a drawbolt-expander mechanism disposed to radially displace the blades against the inner surface of the pipe to secure the abutting mounting plate thereon and being and reaching through the axial bore of the mounting plate and sized to fit within the pipe for expanding when inserted therein to be secured on one side of the mounting plate;

means including a split clamp that clamps onto the concentric projection to arrest further rotational motion when the boring means is aligned with an opening on the mounting plate and an extension is provided with an elongate foot held on the surface of the mounting plate near its periphery for further assuring the perpendicular attitude therefrom and being carried on the concentric projection on the other side of the mounting plate having the extension for rotatably engaging the mounting plate to maintain a perpendicular attitude therefrom;

means mounted on the engaging means for effecting parallel and perpendicular displacements with respect to the surface of the pipe boss flange;

means mounted on the effecting means for boring aligned holes in the pipe boss flange after the engaging means and the effecting means have aligned the boring means with the openings in the mounting plate;

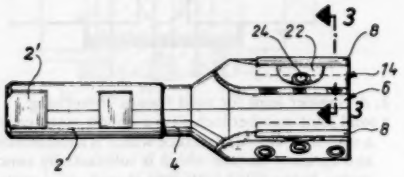
means carried about the periphery of the mounting plate for aligning it with the surface of the pipe boss flange; and

means disposed in each of the openings of the mounting plate for guiding the boring means into the surface of the pipe boss flange.

4,011,025
EXPANDING REAMER

Dieter Kress, Aalen, Germany, assignor to MAPAL Dr. Kress KG, Aalen, Germany

Filed June 10, 1975, Ser. No. 585,464
Claims priority, application Germany, July 16, 1974, 2434041
Int. Cl.² B23B 29/02
U.S. Cl. 408—153 9 Claims



1. A reamer comprising:

a. an elongated shank having an axis;

b. a cutter head fixedly secured on an axially terminal portion of said shank,

1. said cutter head having a core portion and a plurality of rib portions radially projecting from said core portion in cirumferentially spaced relationship,

2. each rib portion having a first axially elongated flank and a second, axially elongated flank,

3. the first flank of each rib portion and the second flank of a circumferentially adjacent rib portion bounding a flute therebetween,

4. each rib portion being formed with a plurality of bores elongated in a direction transversely intersecting said first and second flanks thereof;

c. a cutting blade associated with each rib portion and having two spaced edge portions elongated in a common direction, one of said edge portions being formed with a cutting edge;

d. clamping means releasably clamping the associated blade to the first flank of said rib portion in a position in which said one edge portion is axially elongated and projects radially beyond said rib portion, said clamping means including

1. a clamping screw received in a first one of said bores, and

2. a clamping shoe retained by said screw and engaging a face of said blade intermediate said edge portions;

e. an abutment member movable in at least one other bore of each rib portion and having a cam face obliquely inclined relative to the direction of elongation of said at least one other bore, said cam face radially engaging the other edge portion of said blade remote from said cutting edge; and

f. a backing screw threadedly movable in said at least one other bore and limiting movement of said abutment member under radial pressure exerted by the engaged blade.

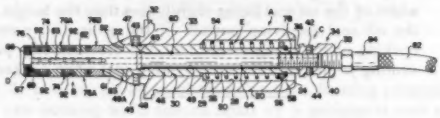
4,011,026
INTERLOCK CUTTING TOOL HOLDER

Gene Lee Bennett, North Madison, Ohio, assignor to Genio Tools, Inc., Mentor, Ohio

Continuation-in-part of Ser. No. 277,636, Aug. 3, 1972, Pat. No. 3,907,453. This application Mar. 21, 1974, Ser. No. 453,218

Int. Cl.² B23B *29/03*

U.S. Cl. 408—199 **4 Claims**



1. A cutting tool holder for securing at least one apertured cutting tool in a desired spaced relationship to a metal removal machine as said cutting tool is selectively engaged with a workpiece for performing a cutting operation, said holder comprising:

an elongated holder body having a longitudinal axis and a first end face,

a bore extending longitudinally through said first end face and said body;

an elongated shaft axially displaceable relative to said body and having a tool mounting portion and a shaft mounting portion, said tool mounting portion extending outwardly of said body from said first end face and slidably and rotatably receiving said apertured cutting tool, and said shaft mounting portion being received in said bore and extending substantially longitudinally through said holder body from said first end face,

stop collar means fixed on said tool mounting portion of said shaft and spaced from said holder body, said cutting tool being axially positioned on said tool mounting portion between said collar means and said first end face,

means interengaging said cutting tool and stop collar means to prevent rotation of said cutting tool relative to said shaft and including axially opposed cooperably interengaged means, and

means releaseably interconnecting said shaft and said body to axially position said stop collar means relative to said first end face to axially capture said cutting tool and retain said opposed means in interengagement, said means releaseably interconnecting said shaft and said body including spring means received in said bore and biasing said shaft in the direction to displace said stop collar means toward said first end face.

4,011,027
STAIN REMOVAL APPARATUS

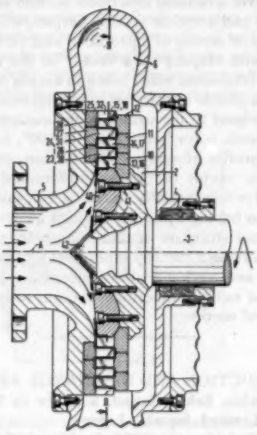
Harald Selder, Dachau, Switzerland, assignor to Escher Wyss G.m.b.H., Ravensburg, Wurttemburg, Germany

Filed Sept. 22, 1975, Ser. No. 615,527

Claims priority, application Switzerland, Sept. 23, 1974, 12842/74

Int. Cl.² F01D *1/06*

U.S. Cl. 415—121 B **5 Claims**



1. A stain removal apparatus for paper pulp comprising

a housing;

a rotor rotatably mounted in said housing on a longitudinal axis;

a plurality of concentric rows of spaced apart teeth mounted on said rotor;

a plurality of concentric rows of spaced apart teeth mounted on said housing and disposed in alternating manner with said rows of teeth on said rotor; and

a plurality of check members secured to said rotor, each said check member being disposed adjacent a respective one of said teeth of the innermost row of said rows of teeth, each said check member having a thickness in a plane radial to said axis and at each respective tooth equal to the thickness of said tooth thereat in a plane radial to said axis and merging at a point remote from said tooth into said rotor.

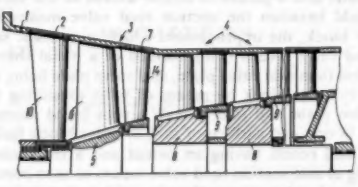
4,011,028
AXIAL-FLOW TRANSSONIC COMPRESSOR

Anatoly Nikolaevich Borsuk, ulitsa Metallurgov, 40, kv. 7, Moscow, U.S.S.R.

Filed Oct. 16, 1975, Ser. No. 623,012

Int. Cl.² F01D *1/02*

U.S. Cl. 415—192 **2 Claims**



1. An axial flow transsonic compressor comprising: a compressor housing; an inlet bladed stator structure; at least one transsonic compression stage and at least one subsonic compression stage; said inlet bladed stator structure, said tran-

ssonic compression stage and said subsonic compression stage being arranged within said compressor housing, in succession along the flow path of the compressed fluid through said compressor and defining the flow section thereof, said transsonic stage comprising a transsonic rotor and a bladed stator structure, said bladed stator structure being mounted downstream along the path of the compressed fluid from said transsonic rotor, said subsonic stage comprising a subsonic rotor and a stator structure; said inlet bladed stator structure comprising blades each having a peripheral section perpendicular to the blade axis, a radially innermost section perpendicular to the blade axis and a middle section perpendicular to the blade axis, the angle of setting of a profile of said peripheral section, determined with respect to a vector of the circumferential speed of said transsonic rotor being in excess of 90°, the angle of setting of a profile of said radially innermost section determined with respect to the vector of the circumferential speed of said transsonic rotor being less than 90°, and the angle of setting of a profile of said middle section, determined with respect to the vector of the circumferential speed of said transsonic rotor substantially equalling 90°, said profile of said middle section having a middle line with a curvature equalling zero, said stator structure of said transsonic stage comprising blades each having a radially innermost section and a peripheral section, and having a chord increasing in value from a profile of said radially innermost section toward a profile of said peripheral section.

4,011,029

FLUID SUCTION AND DISCHARGE APPARATUS

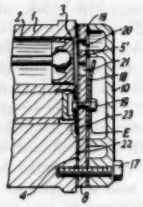
Shigemi Shimizu, Sakai, Japan, assignor to Sankyo Electric Company Limited, Isesaki, Japan

Filed May 16, 1975, Ser. No. 578,311

Claims priority, application Japan, May 17, 1974, 49-56031; May 17, 1974, 49-56032

Int. Cl.² F04B *1/12*

U.S. Cl. 417—269 **2 Claims**



1. In a fluid suction and discharge apparatus including a cylinder block formed with a plurality of cylinders in parallel with one another, pistons slidably reciprocated in the cylinders for fluid suction and discharge, a valve plate secured to the cylinder block at one end thereof with inlet and outlet openings in registry with each of said cylinders, discharge valve means, a sheet of suction reed valve means formed of a metal sheet and formed with a plurality of suction reeds corresponding to respective ones of said cylinders, the suction reed valve means being held between the cylinder block and the valve plate, and a gasket of similar extent as the valve plate being held between the suction reed valve means and the cylinder block, the improvement which comprises: said suction reed valve means being formed of a metal sheet of an extent less than said valve plate, said valve plate being secured to said cylinder block by means of bolts extending through said valve plate and said gasket, a spot faced recess being formed in one end surface of said cylinder block facing said gasket, said recess having an extent and a thickness corresponding to said suction reed valve means so as to contain said suction reed valve means therein, said gasket being placed between, and being in contact with, said cylinder block and said valve plate at the peripheral portion thereof, and said cylinder block and said suction valve at the central portion thereof.

4,011,030

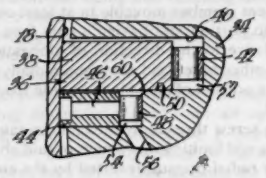
ENGINE SEAL ASSEMBLY

Paul J. Staebler, Dunlap; Ziedonis I. Krauja, and Alexander Goloff, both of East Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 31, 1975, Ser. No. 627,569

Int. Cl.² F01C *19/00, 1/02;* **F16J** *9/16, 15/00*

U.S. Cl. 418—51 **4 Claims**



1. In an internal combustion engine, the combination comprising:

a housing defining an operating chamber having a wall;

an output shaft journalled in said housing;

a piston operatively associated with said shaft and movable within said housing;

a seal receiving groove on said piston, said groove including a step to define a relatively deep compression seal receiving portion and a relatively shallow oil seal receiving portion, said step being slightly crowned;

a compression seal received in said groove and sealingly engaging said wall; and

an oil seal received in said groove in side-by-side, substantially abutting relation within said compression seal, the width of the oil seal being slightly less than the height of the oil seal receiving portion of the groove to permit cocking of the compression seal, the crowned step preventing jamming of the compression seal when cocked.

4,011,031

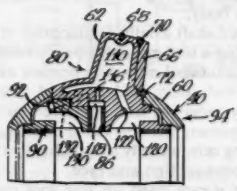
ROTOR CONSTRUCTIONS FOR SLANT AXIS ROTARY MECHANISMS

David E. Hackett, Washington, and Paul J. Staebler, Dunlap, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 9, 1976, Ser. No. 675,359

Int. Cl.² F01C *1/02, 21/06*

U.S. Cl. 418—53 **10 Claims**



1. In a slant axis rotary mechanism, the combination of

a housing defining a chamber,

a shaft journalled in said housing and having an angular eccentric within said chamber,

a radially outwardly extending thrust collar on said eccentric between the ends thereof, and

a rotor within said chamber and journalled on said eccentric, said rotor having a hub and a peripheral flange and being defined by a centerpiece including said flange and part of said hub and having a bearing pad embracing one side of said thrust collar, an intermediate piece secured to said centerpiece on one side thereof and having a bearing pad embracing the other side of said thrust collar, and a pair of covers, each defining part of said hub, one secured

to said centerpiece and the other secured to and covering said intermediate piece.

4. The slant axis rotary mechanism of claim 1 wherein said centerpiece includes plural, angularly spaced coolant receiving cavities, and means for directing coolant to said cavities.

4,011,032
SYSTEM FOR LIQUID COOLING OF A ROTOR OR A ROTARY MECHANISM

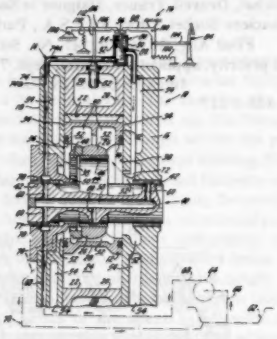
Johannes Steinwart, Obersulm-Willsbach; Armin Bauder, Neckarsulm, and Wulf Leitermann, Bad Wimpfen, all of Germany, assignors to Audi NSU Auto Union Aktiengesellschaft, Neckarsulm, Germany

Filed Feb. 4, 1976, Ser. No. 655,013

Claims priority, application Germany, Mar. 21, 1975, 2512425

Int. Cl.² F01C *21/06*

U.S. Cl. 418—84 **7 Claims**



1. In a rotary piston mechanism having a housing comprising two housing walls spaced apart by a peripheral wall to define a multi-lobe, trochoidal-shaped cavity and a rotor eccentrically supported for planetary movement within said cavity and which rotor has a hub portion and peripheral wall portions defining cooling spaces therebetween which communicate with the area exteriorly of the rotor through an opening adjacent each end of the hub portion, an improved rotor cooling system comprising:

a. a pressurized source of cooling fluid;

b. at least one discharge nozzle communicating through a supply passage means with said source of pressurized cooling fluid;

c. said nozzle being disposed in one of said housing walls and positioned so as to emit a stream of cooling fluid toward and into said opening in the rotor and the cooling spaces therein; and

d. means for controlling flow of cooling fluid through the supply passage means and to the discharge nozzle in accordance with the pressure conditions of the cooling fluid, and the temperature and load operating conditions of the mechanism.

4,011,033
POSITIVE DISPLACEMENT VANE TYPE ROTARY PUMP

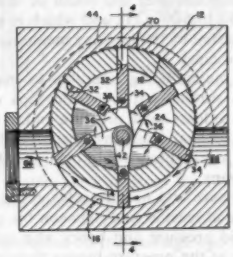
Charles A. Christy, 201 Airport Drive, No. 34, Farmington, N. Mex. 87401

Filed Apr. 2, 1975, Ser. No. 564,288

Int. Cl.² F01C *1/00*

U.S. Cl. 418—253 **6 Claims**

1. A vane rotary device comprising a housing member having a cavity extending therethrough, said cavity including two cylindrical portions having spaced-apart centers but having substantially equal radii of curvature, first and second end closure members, a rotor disposed in said cavity and rotatably supported in said housing member for rotation about an axis coaxial with the center of a first one of said two cylindrical portions, said rotor having a plurality of radial openings therein, vane means disposed in each of said radial openings for sliding movement therein and rotary movement along with said rotor, an inlet passage and an outlet passage in said housing member communicating with said cavity, said inlet passage being separated from said outlet passage by said first and second cylindrical portions, a second cylindrical portion of said cavity forming a circumferential channel extending from said inlet passage to said outlet passage, said channel in operation of said pump serving as a fluid pumping chamber, said vane means extending radially outwardly of said rotor and in substantial pressure sealing relationship with said channel but maintaining a slight clearance therebetween while being rotated through said channel by said rotor thereby pumping fluid



from said inlet passage to said outlet passage, said first cylindrical portion of said cavity constituting a non-pumping circumferential portion between said outlet passage and said inlet passage over which said rotor passes with said vane means retracted within said rotor and a circumferential groove extending in said first cylindrical portion to provide communication only between radial openings simultaneously passing said first cylindrical portion to relieve pressure therein and thereby to facilitate radial movement of said vane means, and said vane means comprise a plurality of sliding blade members each of which is supported on a fixed journal element for pivotal movement about an axis parallel to but eccentric to the axis of rotation of said rotor by at least one radially inwardly extending connecting link pivotally connected to said journal element and to said blade member.

4,011,034
PRODUCTION OF FIBROUS SHEET MATERIAL

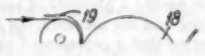
Harold George Curry, Hambrook near Bristol; Brian William Attwood, Hanham near Bristol; Derek Graham Walter White, Bristol, all of England; John Mosgaard Christensen, Risskov, and Karl Kristian Kobs Kroyer, Viby J, both of Denmark, assignors to Karl Kroyer St. Anne's Limited, Bristol, England

Continuation of Ser. No. 533,627, Dec. 19, 1974, abandoned, which is a division of Ser. No. 375,094, June 29, 1973, abandoned. This application Apr. 9, 1976, Ser. No. 675,319

Claims priority, application United Kingdom, July 8, 1972, 32098/72

Int. Cl.² D21F *3/00*

U.S. Cl. 425—80 **6 Claims**



1. Apparatus for forming a sheet of paper or paperboard comprising:

means for dry-laying a web including essentially cellulosic

fibers by depositing dry fibers in an air stream onto a movable band and means for moistening the fibrous web to permit consolidation thereof,

and consolidating means for consolidating the moistened, dry-laid fibers of the web to increase its strength, said consolidating means comprising,

a consolidating surface, and means for heating said surface,

a backing means for holding a newly formed web in contact with an area of the heated surface, the backing means exerting at least a limited pressure urging the web against the surface,

and at least two pressure means spaced apart along said surface for pressing against said backing means and hence acting therethrough to press the said web against the heated surface at the nip formed between the pressure means and the said surface with a pressure which is substantially uniform over the width of the web, which is between 150 to 500 p.l.i., and which is greater than the pressure exerted by the backing means along said surface between the nips,

said backing means being operable to maintain the web against the surface between said nips of the pressure means with at least some pressure and to maintain a level of transfer of heat from the heated surface to the web above that level which would occur in the absence of a backing means,

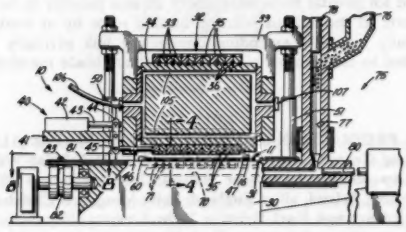
such that pressure and heat transfer are maintained along said surface at least at and between the pressure means, wherein said pressure and hence also said heat transfer are greater at the pressure means than in the space between them.

4,011,035

APPARATUS FOR MOLDING CHARACTERS ON A BLANK

Russell L. Root, Cleveland, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Mar. 12, 1973, Ser. No. 340,174
Int. Cl.² B29C 27/00
U.S. Cl. 425—121 **8 Claims**



1. Apparatus for molding a plurality of plastic characters on the face of a plastic blank having passage means extending therethrough, said apparatus comprising:

support means engageable with the reverse surface of the blank for supporting the blank in molding position,

die means having gate-free cavities corresponding to the shape of the characters to be molded, said die means comprising a plurality of die members in side-by-side relation, each having a plurality of said cavities therein,

means supporting said die members for movement relative to each other so that a plurality of cavities defining selected characters can be aligned adjacent the passage means in the blank,

means for effecting relative movement of said plurality of die members and said blank to position an area on the die members surrounding said aligned cavities in abutting engagement with the face of said blank,

means for forcing plastic material first through the passage means in said blank and thence into said aligned die cavities after said die members and the face of the blank have been positioned in abutting engagement to simultaneously mold the characters defined by said aligned cavities in adhering relationship to the face of said blank, said means including passageways in said support means communicating with said passage means in said blank, and

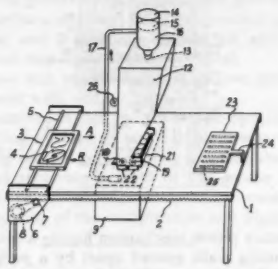
said support means including as a portion thereof a valve member providing a surface on which the reverse surface of the blank rests, and means for moving said valve member to sever material in the passageways from said blank.

4,011,036

MOLDING APPARATUS WITH MATERIAL SMOOTHING MEANS AND RECYCLING MEANS

Lucien Bichet, Draveil, France, assignor to Societe Immobiliere et Financiere Suchet Alfort S.I.F.S.A., Paris, France

Filed Aug. 28, 1974, Ser. No. 501,031
Claims priority, application France, Sept. 7, 1973, 73.32297
Int. Cl.² B29C 29/00
U.S. Cl. 425—217 **8 Claims**



1. Apparatus for filling one or more cavities of a synthetic elastomeric mold with powdered plastic material and for preliminary gelation of said material, comprising:

a distributor means for depositing powdered material in the mold;

leveling means for leveling with the top of the mold the powdered material deposited in the mold by said distributor means;

a heat generator for effecting preliminary gelation of the leveled powdered material deposited in the mold, said heat generator comprising a horizontal plate, equipped on its lower surface with high intensity heating means;

a horizontally supported frame along which are disposed in series said distributor means, said leveling means and said heat generator;

carriage means, horizontally reciprocably movable along said frame, for reciprocably moving the mold from an initial position to said distributor means, from thence past said leveling means to said heat generator, and then back to the initial position, said carriage means comprising a perforated plate or grill on which the mold can be carried so as to be level, said perforated plate or grill having a surface area greater than that of the mold in contact therewith, whereby the mold does not totally cover said perforated plate or grill; and

return means for returning the excess powder after said leveling means to said distributor means, said return means including a holding bin below the level of said carriage means and substantially disposed beneath said distributor means and said leveling means, said holding bin having a sifting means at the entrance thereto, below the level of said carriage means, for separating non-powder masses from the powder.

4,011,037
CONVEYOR BOAT FOR HIGH-TEMPERATURE CONTINUOUS FURNACE

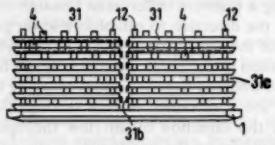
Viktor Mathieu, Neuberg II, and Reinhard Schäfer, Rodenbach I, both of Germany, assignors to Reaktor-Brennelement Union GmbH, Hanau, Germany

Filed May 15, 1975, Ser. No. 577,852

Claims priority, application Germany, May 27, 1974, 2425526

Int. Cl.² F27D *5/00*

U.S. Cl. 432—258 **3 Claims**



1. A boat for carrying a load of stacked layers of interspaced pellets through a high-temperature continuous furnace, the boat comprising a horizontal base for carrying the load, a plurality of upstanding posts mounted on the base, and a plurality of sheets having holes through which the posts are passed to hold the sheets against horizontal shifting, the sheets being adapted to be individually interposed between each two of said layers and having edge shapes leaving the periphery of each of the layers horizontally free for a substantial portion of each layers's height, said edge shapes comprising angularly bent-edge portions of the sheets, said portions being adapted to have less vertical extent than the layer's height but the extent being adequate to prevent the pellets from falling sidewise over the peripheries of the sheets, said posts and said sheets forming two side-by-side groups and the adjacent bent edges portions of each two side-by-side sheets, comprising bent-down edge portions, the balance of the sheets bent-edge portions being bent-up edge portions.

4,011,038
PLATE PROVIDED WITH APERTURES SEPARATED FROM EACH OTHER BY SEPARATING RIBS FOR AN INSTALLATION FOR THE MANUFACTURE OF STICKS FROM DOUGH MATERIAL

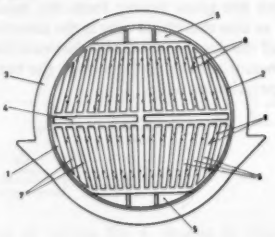
Willem Hendrik Willemsen, 83, Westervalge, Warffum, Netherlands

Filed Apr. 15, 1976, Ser. No. 677,483

Claims priority, application Netherlands, Feb. 2, 1976, 7601006

Int. Cl.² B29C *23/00;* **B29F** *3/00*

U.S. Cl. 425—302 R **6 Claims**



1. A plate provided with apertures separated from each other by separating ribs for a device for the manufacture of so-called sticks from dough material, said plate being destined to be provided at the end of a tank, in said tank, means being provided for pressing the dough material intermittently through the apertures of the plate, means for cutting of the dough material pressed through said plate being provided under said plate, at least two opposite walls of said separating ribs of the apertures having slot-like recesses extending over at least a part of the height of said opposite walls until the under surface of said plate.

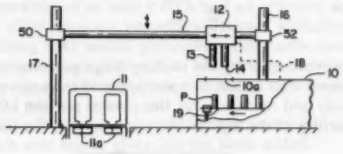
4,011,039
PARISON TRANSFER DEVICE

David C. Oas, Downington, Pa., and Waldemar E. Kmentt, Beloit, Wis., assignors to Beloit Corporation, Beloit, Wis.

Filed Apr. 7, 1975, Ser. No. 565,361

Int. Cl.² B29C *17/07*

U.S. Cl. 425—397 **18 Claims**



1. In combination with a parison heating oven and a mold for forming the parison into a finished article, a transfer means for transferring heated parisons from the oven to the mold, said transfer means comprising:

a carriage,

picker means mounted on the carriage operative to grasp a heated tubular parison at an upper portion thereof and remove said parison from the oven while holding the same in a substantially vertical plane during transfer to the mold,

means moving the carriage along a given path between the oven and the mold, said path being straight and horizontal, said carriage being mounted on a horizontally extending structure for horizontal movement therealong between the oven and the mold, and said horizontally extending structure including gear means mounted to engage a toothed rack on a frame means, said gear means and the toothed rack cooperating to provide guidance for vertical movement of the horizontally extending structure therealong, whereby the picker means is movable simultaneously both horizontally and vertically by movement of the carriage on the horizontally extending structure and by vertical movement of the horizontally extending structure on the frame means, respectively,

power actuating means including a movable actuated element operatively connected to the carriage and having at least a component of movement substantially parallel to said given path to cause movement of the carriage along said path,

and including a displacement multiplication means operatively interconnecting the actuated element with the carriage such that the carriage and hence also the picker means and the parison carried thereby are moved a greater distance along said path than the said component of movement of the actuated element is moved parallel to said path during any given movement of said actuated element.

4,011,040
LIGHTER COVER

Harold G. Lacks, 2100 S. Ocean Lane, Apt. 2407, Fort Lauderdale, Fla. 33316

Filed Dec. 8, 1975, Ser. No. 638,699

Int. Cl.² F23D *2/36*

U.S. Cl. 431—344 **3 Claims**

1. In a lighter and lighter cover device with the lighter including a lighter body having two end portions larger than a narrower central portion, the improvement of which comprises:

a lighter cover including,

a main member including a portion of a mating hinge means, and

a secondary member including the other portion of a mating hinge means, said secondary member connected to said

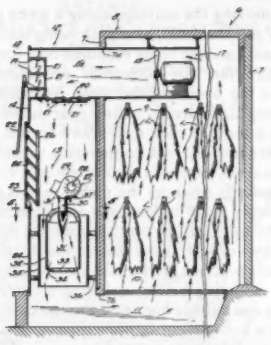
main member by the mating hinge portions to provide a scissor-like action to open one end to receive the lighter body and to close over the central portion after one end portion of the lighter body moves past the hinge means.

4,011,041

TOBACCO CURING AND DRYING APPARATUS

John S. Taylor, Jacksonville, Fla., assignor to Tifcon Company, Lenox, Ga.

Filed June 16, 1975, Ser. No. 587,158
Int. Cl.² F26B *3/02*; A24B *1/02*
U.S. Cl. 432—21 **15 Claims**



1. A method of processing products such as tobacco, wherein the products to be processed are placed in an enclosure which has an inlet and an outlet and through which heated air is circulated from said inlet to said outlet, which method comprises:

A. communicating the outlet of the enclosure with the inlet of a duct that has its outlet communicated with the inlet of the enclosure;

B. effecting a positive circulation of air through the enclosure by drawing air from its outlet and forcing it into the duct to thereby create a zone of positive pressure in the duct near its inlet to force the air through the duct towards its outlet;

C. combusting fuel in the duct at a combustion zone located downstream of said zone of positive pressure;

D. supplying air for such combustion from a location in the duct between said zone of positive pressure and said combustion zone; and

E. creating a pressure differential through the combustion zone in the direction to establish a lower pressure downstream of the combustion zone than that which obtains at the location in the duct from which the air for combustion is taken, whereby heat and gases resulting from the combustion are constrained to flow through the combustion zone in the direction of air flow through the duct, to thereby minimize the possibility of any substantial back draft through the combustion zone.

3. Apparatus for processing products such as tobacco, by circulating heated air through an enclosure having an air inlet and an air outlet and in which the product being processed is so placed that the air being circulated through the enclosure from its inlet to its outlet can reach substantially all parts of the product, said apparatus comprising:

A. means defining a duct having an outlet connected with the air inlet of the enclosure;

B. air inlet means for said duct;

C. means for communicating said air inlet means with the air outlet of the enclosure, so that air leaving the enclosure can enter the duct;

D. air moving means having a suction side and a pressure side, located near said inlet means for effecting movement of air through the duct towards its outlet, and for concomitantly effecting circulation of air through the enclosure from its air inlet to its air outlet;

E. a forced draft fuel burner having a fan with a definitely defined air intake, to force air entering said intake through the burner, the burner also having a mouth from which flame and hot gases issue when the burner is in operation;

F. means mounting the fuel burner with its air intake communicating with the interior of the duct at a first zone thereof that is downstream of the pressure side of the air moving means and with its mouth debouching into the duct at a second zone thereof that is downstream of said first zone; and

G. means forming a constriction in the duct between said first and second zones to cause air passing through the duct to have a substantially higher pressure at said first zone than at said second zone, and operable to constrain heat and hot gases issuing from the mouth of the fuel burner to flow therefrom only in the direction towards the outlet of the duct, and thereby eliminate the possibility of any substantial back draft through the burner whether it is in operation or not.

4,011,042
OXIDATION OF VAT AND SULFUR DYES

Harry Stitzel, Heath Springs, S.C., assignor to Olin Corporation, New Haven, Conn.

Filed Aug. 3, 1971, Ser. No. 168,734
Int. Cl.² C09B *9/00, 49/00*
U.S. Cl. 8—34 **9 Claims**

1. In a method for dyeing cotton or cellulose-polyester blended textiles with vat or sulfur dyes, comprising the steps of applying a vat or sulfur dye to said textile and subsequently oxidizing said dye by contacting it with an aqueous solution of an oxidizing agent the improvement wherein said aqueous solution comprises 0.005–5 percent by weight sodium bromite and has a pH of at least 6.

8. In a method for dyeing cotton or cotton-polyester textile fibers, comprising the steps of applying at least one vat or sulfur dye in reduced form to said fibers and subsequently oxidizing said dye by contacting it with an aqueous solution of an oxidizing agent, the improvement wherein said aqueous solution of an oxidizing agent comprises, by weight 0.01 to 2% sodium bromite, 0.048 to 0.099% alkali and 95 to 99.99% water, and has pH of at least 8.

4,011,043
LIQUID AMMONIA DYEING PROCESS

Jean-Paul Dalle, and Maryvonne Vaesken, both of Saint Quentin, France, assignors to Opidryochimie, Grugies; Alain Declercq and Philippe Declercq, both of Hem, all of, France

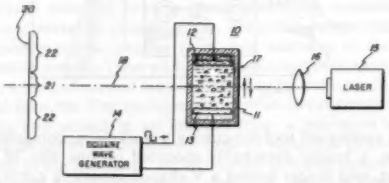
Filed May 29, 1975, Ser. No. 581,795
Claims priority, application France, June 6, 1974, 74.19661
Int. Cl.² D06P *3/14, 1/673*
U.S. Cl. 8—54 **9 Claims**

1. A process of dyeing textile material formed of natural or synthetic polyamides, polyacrylics, polyesters or chlorinated hydrocarbons, wherein the material is first impregnated with liquid ammonia in an impregnation zone, the ammonia in said zone is removed and the material, still impregnated with ammonia, is dyed.

4,011,044
USE OF LASER SPECKLE PATTERNS FOR MEASUREMENT OF ELECTROPHORETIC MOBILITIES

Egidijus E. Uzgiris, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed July 6, 1976, Ser. No. 702,941
Int. Cl.² G01N *27/26, 33/16*
U.S. Cl. 23—230 B **6 Claims**



1. A method of testing for a change in electrophoretic mobility of particles suspended in a solution, comprising:

directing coherent light onto said solution such that light scattered from said solution impinges on a display screen in a speckle pattern configuration;

applying a square wave voltage across said solution; and

observing movement of said speckle pattern on said screen along the direction of the applied electric field across said solution.

4,011,045
TURBIDITY REDUCTION IN TRIGLYCERIDE STANDARDS

Dean P. Bonderman, 586 W. 77th North Drive, Indianapolis, Ind. 46260

Filed Feb. 14, 1975, Ser. No. 549,940
Int. Cl.² G01N *31/02, 31/14*
U.S. Cl. 23—230 B **17 Claims**

1. A method of preparing serum which is suitable for use as a triglyceride standard comprising:

a. reducing the triglyceride level normally present in the serum,

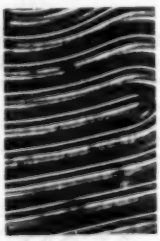
b. after said reducing, adding to the serum glycerides of fatty acids having from 5 to 10 carbon atoms to achieve a concentration of at least 0.03% and an effective amount of an alkyl-phenoxy polyethoxyethanol surfactant for solubilizing said added glycerides, said surfactant containing an average of from 6 to 10 ethoxy groups, and the alkyl group of said surfactant containing from about 5 to about 14 carbon atoms, and

c. preserving the serum by lyophilizing or freezing the serum to which said added glyceride has been added.

4,011,046
LIQUID CRYSTAL QUANTITATIVE ANALYSIS METHOD FOR OPTICALLY ACTIVE COMPOUNDS

Mortimer M. Labes, Philadelphia, Pa., assignor to Temple University, Philadelphia, Pa.

Filed Nov. 12, 1975, Ser. No. 631,100
Int. Cl.² G01N *21/46, 23/201, 23/207*
U.S. Cl. 23—230 LC **31 Claims**



1. Method for quantitatively analyzing a sample, for a specific optically active compound contained therein, by first determining the relationship between line spacing of differentially refracted light and concentration of said optically active compound in a nematic liquid crystalline material oriented in a first standardized cell consisting of a thin layer of said liquid crystalline material disposed between transparent cell face members, and subsequently injecting a preselected amount of said sample into the nematic liquid crystalline layer of a second standardized cell identical with said first cell, observing the line spacing of refracted light in said second cell and comparing it to the relationship determined in said first cell and, on the basis of said comparison, determining the quantity of said optically active compound in said second cell.

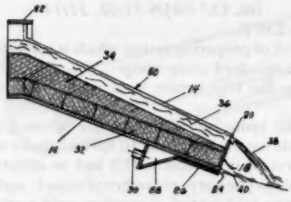
4,011,047
SMELT SPOUT FOR RECOVERY BOILER

Ronaldo Joseph Tremblay, Windsor, Canada, assignor to Domtar Limited, Montreal, Canada

Filed Dec. 5, 1975, Ser. No. 638,197
Int. Cl.² B01J *1/00;* **D21C** *11/00*
U.S. Cl. 23—252 R **2 Claims**

1. A smelt spout for a paper pulp mill chemical recovery furnace, said spout comprising a metal trough having a bottom wall, a refractory lining in said trough, means for connecting said trough to said furnace at one end of said trough, said trough at the end opposite said one end terminating in a free end from which a smelt stream flows, nozzle means immediately adjacent to the bottom of said trough and said free end

of said trough means for directing steam to said nozzle means, said nozzle means forming a steam jet intersecting the trajectory of said stream of smelt flowing from said spout thereby to disintegrate said stream, said nozzle means being positioned



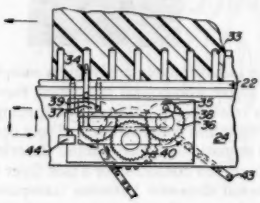
relative to said trough means so that said jet passes immediately adjacent said bottom wall at said free end and impairs the build up of slag formed by solidification of said smelt onto said bottom wall adjacent said free end.

4,011,048

INCUBATION APPARATUS

Edgar G. Johnson, Jr., and Howard L. McGill, both of Huntsville, Ala., assignors to Micromedic Systems, Inc., Horsham, Pa.

Filed June 17, 1976, Ser. No. 697,172
Int. Cl.² G01N *33/16*; B01L *7/00*
U.S. Cl. 23—259 **8 Claims**



1. An incubation apparatus for use in automated biochemical analyzer systems, which comprises

a block of thermoconductive material having means for temperature control attached thereto and a plurality of rows of regularly spaced wells, said wells extending into the block from a bottom surface of the block and having openings facing downward;

a pair of flat plates of insulating material, said plates lying in the same plane, each with an edge in mutual abutment, one plate being fixed and the other longitudinally slidable a given incremental distance in a direction away from the point of abutment, with the block with well openings facing downward being slidably carried upon said pair of insulating plates; and

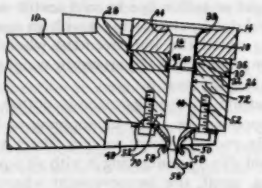
means for lifting into a row of wells a set of sample carriers from a carrier holder disposed directly beneath the block and insulating plates and in alignment with a row of wells in the block exposed to the carrier holder by a transverse space created by incrementally sliding the slidable plate, and for lowering a set of sample carriers from a row of wells into a carrier holder disposed directly beneath and in alignment with the row of wells.

4,011,049

METHOD OF AND DEVICE FOR HOLDING A CUTTING INSERT IN THE POCKET OF A TOOL HOLDER

James F. McCreery, Latrobe, Pa., assignor to Kennametal Inc., Latrobe, Pa.

Filed Sept. 19, 1975, Ser. No. 614,975
Int. Cl.² B26D *1/00*
U.S. Cl. 29—96 **6 Claims**



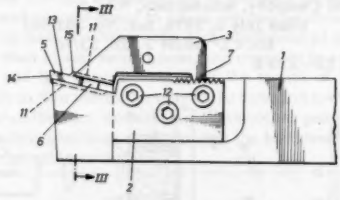
1. In a holder for supporting a cutting insert wherein the holder has an insert receiving pocket with a bottom wall and side wall means and a pin element which extends downwardly through a hole in the insert and a hole in the holder to hold the insert securely against the side wall means of the pocket, the improvement which comprises: one end of said pin element adapted to engage the insert from above, cooperating elements of a press-on, pry-off connection, one of said cooperating elements comprising a spring clip located on the holder and the other element located near the other end of the pin element, the axis of the hole in the holder being offset toward the side wall means of the pocket from the axis of the hole in the insert when said insert is abutted against the bottom and side walls of said pocket, the pin element adapted to engage the lateral surfaces of the holes in the insert and the holder and hold said insert against at least the side wall means when said cooperating elements of a press-on, pry-off connection on said holder and pin element are engaged.

4,011,050

CUTTING-OFF TOOL

Karl Zinner, Helenenstrasse 18, 8500 Nuremberg, Germany

Continuation of Ser. No. 478,670, June 12, 1974. This application Nov. 3, 1975, Ser. No. 627,845
Claims priority, application Germany, Jan. 30, 1974, 2404302
Int. Cl.² B26D *1/00*
U.S. Cl. 29—96 **7 Claims**



1. A cutting-off tool for cutting a workpiece, comprising a support, a holder detachably mounted on one side of said support, said holder having a V-shaped groove, a cutting bit having a V-shaped bottom part mating with said V-shaped groove in said holder, said cutting bit being made of a single piece of material of sufficient hardness to effect cutting of said workpiece, a clamping plate having one end portion engaging an upper side of said cutting bit and another end portion engaging said holder, securing means detachably holding said clamping plate to said support, said one end portion of said clamping plate having a V-shaped groove, said cutting bit having a front portion and a rear portion, said cutting bit having at its rear portion a V-shaped top part mating with said

V-shaped groove in said clamping plate, said cutting bit having at its front portion a chip-guiding surface having a front longitudinal end coincident with the front longitudinal end of said cutting bit and a rear longitudinal end located at the junction between said front and rear portions, an elongated groove in said chip-guiding surface beginning at said front of said chip-guiding surface and extending toward the rear end portion of said chip-guiding surface, said elongated groove terminating at a position spaced from said juncture of said front and rear portions to provide a generally flat and ungrooved rear chip-guiding surface section disposed between the rear end of said groove and said juncture, the width of said elongated groove being less than the width of said chip-guiding surface, whereby lateral portions of said chip-guiding surface extend on both sides of said elongated groove.

4,011,051

COMPOSITE WEAR-RESISTANT ALLOY, AND TOOLS FROM SAME

Eugene L. Helton, Peoria; Preston L. Gale, Chillicothe; Lowell J. Moen, Peoria, all of Ill.; Robert C. Mueller, Mentor, Ohio; Walker L. Pierce, Jr., and Henry J. Vermillion, Jr., both of Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed May 2, 1974, Ser. No. 466,142

Int. Cl.² B22F *3/00*

U.S. Cl. 29—182 **9 Claims**

1. A composite alloy having high wear-resistance, consisting essentially of cast spheroids of a first alloy consisting essentially of a chromium-iron based alloy of from about 25–70% by weight chromium, from about 6–12% by weight boron, from 0 to about 2% by weight carbon, and iron is the balance, embedded in a matrix of a second tough, ductile alloy in which said first alloy is soluble with difficulty.

4,011,052

ELECTRICAL CONTACT MATERIAL AND PROCESS

Terrence Ardern Davies, Encino, Calif., assignor to Square D Company, Park Ridge, Ill.

Continuation-in-part of Ser. No. 340,440, March 12, 1973, abandoned, and a continuation-in-part of Ser. No. 387,884, Aug. 13, 1973, abandoned. This application Oct. 8, 1975, Ser. No. 620,909

Claims priority, application United Kingdom, Mar. 15, 1972, 12189/72; Aug. 18, 1972, 38568/72; Aug. 25, 1972, 39667/72

Int. Cl.² B22F *1/00*, *3/00*

U.S. Cl. 29—182.5 **57 Claims**

1. A process of improving material used in manufacturing electrical contacts for electrical power applications and made with a first starting material selected from a group essentially consisting of a first metal in powder form and reducible compounds of the first metal in powder form both having a selected maximum particle size, and with a second starting material selected from a group essentially consisting of a second metal in powder form, reducible compounds of the second metal in powder form, and mixtures of the second metal in powder form all having a selected maximum particle size with said second metal selected to be more readily oxidizable than the first metal under similar environmental conditions and added in an amount from a minimum effective amount up to the maximum limit of solubility of the second metal in the first metal by mixing the first and second starting materials together to obtain a mixture having a substantially even dispersion of the first and second starting materials; heating the mixture in a reducing atmosphere at a temperatue below the melting temperature of the alloy of the alloy of the first and second metals in the proportions present to alloy the first and second metals in a powder form; sieving the alloyed mixture to produce a selected maximum particle size; heating the sieved mixture in an oxidizing atmosphere at a temperature and under conditions selected to substantially completely oxidize the second metal and with said temperature below the melting temperature of the alloy of the first and second metals in the proportions present to thereby maintain the mixture in a powder form; and sieving the oxidized mixture to produce a selected maximum particle size, said process comprising:

adding at a selected time during the process an oxide of a third metal selected from a group consisting of the metals in group IA and IIA of a periodic table.

4,011,053

ELECTRICAL CONTACT MATERIAL AND PROCESS

Terrence Ardern Davies, Encino, Calif., assignor to Square D Company, Park Ridge, Ill.

Continuation-in-part of Ser. No. 340,440, March 12, 1973, abandoned, and a continuation-in-part of Ser. No. 387,884, Aug. 13, 1973, abandoned. This application Oct. 15, 1975, Ser. No. 622,786

Claims priority, application United Kingdom, Mar. 15, 1972, 12189/72; Aug. 18, 1972, 38568/72; Aug. 25, 1972, 39667/72

Int. Cl.² B22F *3/00*

U.S. Cl. 29—182.5 **66 Claims**

1. A material for use in making electrical contacts for power level applications consisting essentially of a first metal selected from a group consisting of silver and copper, an oxide of a second metal selected from a group consisting of cadmium, tin, and zinc added in an amount from a minimum effective amount up to a maximum equal to the limit of solubility of the second metal in the first metal, and an oxide of a third metal selected from a group consisting of metals in group IA and IIA of a periodic table.

33. An electrical contact for electrical power applications comprising a first metal selected from a group consisting of silver and copper, an oxide of a second metal selected from a group consisting of cadmium, tin and zinc added in an amount from a minimum effective amount up to a maximum equal to the limit of solubility of the second metal in the first metal, and an oxide of a third metal selected from a group consisting of the metals in groups IA and IIA of a periodic table.

4,011,054

SINTER MATERIAL FOR SEALING STRIPS IN ROTARY PISTON ENGINES

Horst Beyer, Burscheid; Ulrich Buran, Opladen-Quettingen; Norbert Dautzenberg, Meerbusch, and Joseph Hewing, Monchengladbach, all of Germany, assignors to Goetzewerke-Friedrich Goetze AG, Burscheid, Germany

Continuation of Ser. No. 424,802, Dec. 14, 1973, abandoned. This application Sept. 9, 1976, Ser. No. 721,716

Claims priority, application Germany, Dec. 16, 1972, 2261794

Int. Cl.² C22C *1/10*

U.S. Cl. 29—182.7 **15 Claims**

1. In a sintered material for a sealing strip of a rotary piston engine and produced from a powder mixture of 15 to 45 weight percent of vanadium carbide or a mixture of vanadium carbide with at least one other metal carbide and balance essentially iron or an iron alloy, the improvement wherein the powder mixture further comprises at least one additive selected from the group consisting of (1) the compound Cu_3P, (2) an alloy of the system Fe—B, (3) an alloy of the system Cu-Mn, and (4) an alloy of the system Ni—Mn—B, the amount of said additives (1), (2) and (3) when present being 4 weight percent and the amount of said additive (4) when present being 3 to 5 weight percent, said additive being liquid at the material sintering temperature and being effective to wet and partially dissolve the vanadium carbide during the sintering process and prevent the vanadium carbide from breaking out of the sintered material.

4,011,055
ANTI-OXIDATION COATINGS

James Hill, Pamber Heath, and Leslie Boyne, Newbury, both of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Sept. 8, 1975, Ser. No. 611,246

Claims priority, application United Kingdom, Sept. 9, 1974, 39333/74

Int. Cl.² B32B *15/04*

U.S. Cl. 29—195 **7 Claims**

1. A carbon artefact including an anti-oxidation coating over at least part of its surface, said coating comprising:

a layer of silicon on the surface of the artefact;

a layer of nickel overlying the silicon layer;

and a layer of chromium overlying the nickel layer.

7. A carbon artefact as claimed in claim **1** wherein said artefact is a carbon brake disc having peripheral parts of its surface provided with said coating.

4,011,056
QUINARY SILVER ALLOY

Hans T. Steine, Crissier; Rene Wasserman, Echichens, and Wolfgang Simm, Lausanne, all of Switzerland, assignors to Eutectic Corporation, Flushing, N.Y.

Filed June 6, 1975, Ser. No. 584,406

Claims priority, application Switzerland, June 12, 1974, 8010/74

Int. Cl.² C22C *30/02*

U.S. Cl. 29—199 **10 Claims**

8. A brazed joint comprising metal parts joined together with a braze alloy consisting essentially by weight of about 35 to 48% Ag, about 25 to 35% Zn, about 0.5 to 3.5% Sn, about 0.01 to 0.4% Si, 0 to about 1% Ni, 0 to 1% Pd, 0 to 0.5% P and the balance essentially copper.

4,011,057
HINDERED PHENOL ANTIOXIDANT COMPOSITION CONTAINING AN AMINO COMPOUND

George Alvin Sayers, Penns Grove, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 16, 1974, Ser. No. 461,391

Int. Cl.² C10L *1/22*

U.S. Cl. 44—52 **12 Claims**

1. In an antioxidant composition comprising hindered phenol antioxidant, the improvement comprising, in combination with the hindered phenol, from 1% to 10%, based on the combined weight, of at least one amino compound having a pK_b of from 0.3 to 8.0, the amino compound being selected from the group consisting of

i. hydrocarbylamines of the formula,

$$R-\underset{\displaystyle R}{\overset{\displaystyle R}{\underset{|}{\overset{|}{N}}}}-R,$$

wherein each R represents hydrogen or a hydrocarbyl group which has 1 to 24 carbon atoms, the R being joined to the nitrogen atom through a saturated carbon, at least one of the R groups being a hydrocarbyl group,

ii. hydroxyalkyl- and hydroxy(alkyleneoxy) alkylamines of the formula, $R_2N(R'O)_xH$, where R is hydrogen, hydrocarbyl, or $(R'O)_xH$, wherein R′ is alkylene of 2 to 3 carbon atoms and x is from 1 to 5,

iii. cyclic amines of the formula, R-NY, where R is hydrogen or hydrocarbyl, Y is the divalent connecting group $-(CH_2)_m-$, where m = 4 to 6, $-CH_2CH_2-NHCH_2CH_2-$, or $-CH_2CH_2-O-CH_2CH_2-$,

iv. amino compounds of the formula,

$$R_2N-\overset{\displaystyle NR}{\underset{\|}{\overset{\|}{C}}}-NR_2,$$

wherein R represents hydrogen or hydrocarbyl,

v. polyamines of the formula, $R_2N-(R'NR)_xR$, where R is hydrogen or hydrocarbyl, R′ is alkylene of 2 to 8 carbon atoms and x is 1 to 5, and

vi. ammonia.

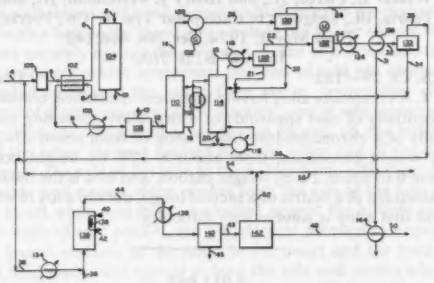
4,011,058
PRODUCTION OF SUBSTITUTE NATURAL GAS FROM GASIFICATION OF COAL CHAR

Marvin M. Johnson; Donald C. Tabler, and Gerhard P. Nowack, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 1, 1975, Ser. No. 618,719

Int. Cl.² C10J *3/00*; C10K *3/00*

U.S. Cl. 48—197 R **21 Claims**



1. A process for the production of a gas comprising methane which comprises, in combination, the steps of

a. gasifying a solid carbonaceous material at an elevated temperature in the presence of air and carbon dioxide to produce a raw process stream comprising carbon monoxide, carbon dioxide and nitrogen;

b. cooling, cleaning and purifying said raw process stream to obtain a stream consisting essentially of carbon monoxide and nitrogen;

c. separating carbon monoxide from said stream consisting essentially of carbon monoxide and nitrogen by contacting said stream in an absorption zone with an absorbent consisting essentially of an inert hydrocarbon diluent and at least one copper sulfonate, wherein said carbon monoxide is taken up in said absorbent, withdrawing from said absorption zone a stream consisting essentially of nitrogen and a stream consisting essentially of said absorbent and said carbon monoxide, passing said stream consisting essentially of absorbent and carbon monoxide to a desorption zone, separating in said desorption zone said carbon monoxide from said absorbent and withdrawing said carbon monoxide from said desorption zone;

d. combining stream with said separated carbon monoxide and reacting the resulting CO/steam mixture in a catalytic methanation zone to produce an effluent gas stream consisting essentially of carbon dioxide, methane and hydrogen; and

e. cooling said effluent gas stream and separating impurities therefrom to produce a product stream comprising methane.

6. A process for the production of a gas comprising methane which comprises, in combination, the steps of

a. gasifying a solid carbonaceous material at an elevated temperature in the presence of air and carbon dioxide to produce a raw process stream comprising carbon monoxide, carbon dioxide and nitrogen;

b. cooling, cleaning and purifying said raw process stream to obtain a stream consisting essentially of carbon monoxide and nitrogen;

c. separating carbon monoxide from said stream consisting essentially of carbon monoxide and nitrogen;

d. combining steam with the separated carbon monoxide and reacting the resulting CO/steam mixture in a catalytic methanation zone by contacting said mixture with a methanation catalyst consisting essentially of nickel, a promoter selected from the group consisting of barium and uranium, and a calcium phosphate support having a Ca:P atomic ratio in the range of 1.4:1 to 2.3:1, wherein the components are present in approximate amounts as follows:

Calcium	5 to 35,	
Phosphorus	2 to 20,	
Nickel	10 to 50	and either
Barium	1 to 20,	or
Uranium	2 to 40,	

all said amounts expressed in terms of weight percent, based upon the weight of the total catalyst, thereby producing an effluent gas stream consisting essentially of carbon dioxide, methane and hydrogen; and

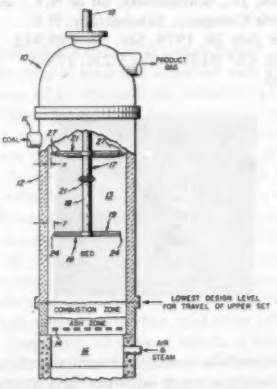
e. cooling said effluent gas stream and separating impurities therefrom to produce a product stream comprising methane.

4,011,059

SELF-CENTERING TRAVERSING STIRRER SHAFT FOR FIXED BED GASIFIER

John W. Daly, Quaker Street, and Kenneth A. Darrow, Sprakers, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 30, 1976, Ser. No. 653,917
Int. Cl.² C01J 3/32
U.S. Cl. 48—85.2 **6 Claims**



1. In apparatus for generating a gas mixture containing combustible components wherein a closed vertically extending vessel is provided with means mounted in the lower region of the interior of said vessel for supporting a bed of solid fuel thereon, first conduit means in flow communication with said interior of said vessel below said supporting means for introducing gas flow into said vessel, second conduit means in flow communication with the upper region of said interior of said vessel for removing product gas therefrom, means in flow communication through the exterior of said vessel with said upper region for introducing solid fuel bodies therein and liquid-cooled means for stirring said bed of solid fuel, said stirring means being adapted for vertical and rotational motions and comprising a depending vertically disposed shaft having a plurality of rabble arms extending from said shaft toward the inner surface of the wall of said vessel, the improvement comprising:

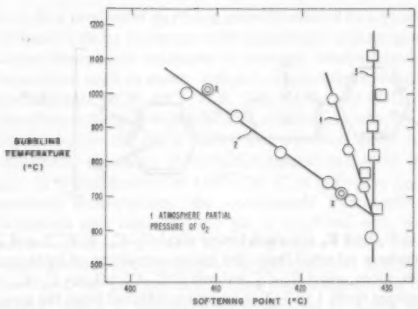
said plurality of rabble arms being divided into a lower set and an upper set, said lower set including at least two arms of substantially equal length angularly disposed relative to each other and said upper set including at least four arms of substantially equal length angularly disposed relative to each other, the arms of said upper set being longer than the arms of said lower set whereby the distal end of each arm in said upper set is at least one-half inch closer to said inner surface of said wall than the distal end of each arm in said lower set and each arm of said lower set being formed with at least one shearing edge at and adjacent the distal end thereof while each arm of said upper set only has the distal end thereof shaped to present an enlarged area for contact with the inner surface of the wall of the gasifier in the event of lateral deflection of the shaft.

4,011,060

METHOD OF CONTROLLING THE SOFTENING POINT OF SOLDER GLASS

Melvin Berkenblit, Yorktown Heights; See Ark Chan, Bronx; Joan B. Landermann, Fishkill; Arnold Reisman, Yorktown Heights, and Takeshi Takamori, Croton-on-Hudson, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 2, 1975, Ser. No. 619,110
Int. Cl.² C03B 5/00
U.S. Cl. 65—134 **22 Claims**



1. A process for controlling the softening point, for minimizing lot by lot scattering of the softening point, and for providing preselected softening point of a solder glass containing copper oxide by controlling the Cu^+ concentration, comprising

A. heating solder glass batch composition containing at least about 0.5% by weight of copper oxide calculated as cupric oxide to a temperature above the softening point of the composition to provide a homogeneous melt;

B. bubbling oxygen-containing gas through said homogeneous melt for a time at least sufficient to achieve equilibrium of the reaction

$$Cu_2O + 1/2O_2 \rightleftharpoons 2CuO$$

and at a temperature and oxygen partial pressure predetermined to provide the desired Cu^+ concentration and preselected softening point of the solder glass; and thereby

C. obtaining said solder glass containing copper oxide and having said preselected softening point.

4,011,061
ARTICLES PROVIDING SUSTAINED RELEASE AND METHOD OF MAKING

Roger K. Forseen, Mahtomedi, and David A. Hofacker, St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 20, 1975, Ser. No. 560,540
Int. Cl.² C05C 9/00; C05G 3/00
U.S. Cl. 71—29 20 Claims

14. A tablet for providing sustained release of plant fertilizer in a moist environment, said article comprising a plurality of agglomerate particles, each comprising a nucleus of organophobic, totally water-soluble fertilizer 100 to 600 micrometers in size and surrounded by talc particles clinging thereto, said talc particles having a median particle size of about 5 micrometers or less and comprising about 5 to 15 percent of the total weight of the article, said agglomerate particles being bound into a solid coherent tablet by a water-permeable matrix comprising 60 to 100% by weight polyethylene and up to 40% by weight paraffin wax.

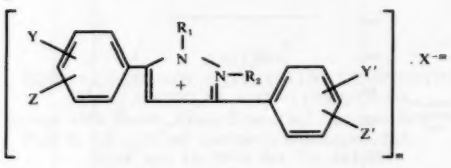
4,011,062
NOVEL COMPOSITIONS CONTAINING ACETYLENIC GLYCOL SAFENERS FOR SPRING WHEAT

Richard Joseph Demchak, and David Lasilla Whitehead, both of Trenton, N.J., assignors to American Cyanamid Company, Stamford, Conn.

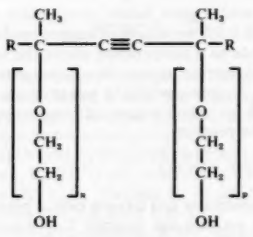
Filed Sept. 9, 1975, Ser. No. 611,748
Int. Cl.² A01N 9/22
U.S. Cl. 71—92 12 Claims

1. A composition of matter comprising: a mixture of from about 90% to about 99%, by weight, of a compound having the formula (I):

(I)



wherein R_1 and R_2 are each lower alkyl C_1–C_4; Y,Y',Z and Z' are members selected from the group consisting of hydrogen, halogen, nitro, alkyl C_1–C_4, haloalkyl C_1–C_4, alkoxy C_1–C_4, m is an integer from 1 to 3; X is an anion selected from the group consisting of acetate, sulfate, hydroxide, hydrogen sulfate, methyl sulfate, benzene sulfonate, p-toluenesulfonate, nitrate, phosphate, carbonate and alkane sulfonate C_1–C_4; and from about 1% to about 10%, by weight, of a compound having the formula:



wherein R is selected from the group consisting of ethyl and 2-methylpropyl; and $n+p$ represents the number 0, 3.5, 10 or 30.

4,011,063
LOW DENSITY ABRASIVE UTILIZING ISOCYANURATE RESIN

Manley R. Johnston, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 5, 1972, Ser. No. 241,449
Int. Cl.² B21B 21/00; B24D 3/32
U.S. Cl. 51—295 13 Claims

1. In a low-density abrasive product wherein abrasive granules are bonded throughout a lofty, porous, compressible, nonwoven fibrous structure having interconnected three-dimensionally extending voids which constitute the majority of the volume thereof, the fibers of said product being bonded to each other and the abrasive granules bonded to said fibers by resinous binder, the improvement which comprises using for said binder the hard, tough, organically substituted polyisocyanurate resin of a cured isocyanate-terminated polyol, said resin having at least 0.5 gram equivalent of isocyanurate and at least 1.3 gram equivalents of urethane and isocyanurate combined, whereby the resulting low-density abrasive has extended wear life and reduced tendency to smear compared to similar products bonded with phenolic resins.

4,011,064
MODIFYING THE SURFACE OF CUBIC BORON NITRIDE PARTICLES

Minyoung Lee, Schenectady; Lawrence E. Szala, Scotia, and Louis E. Hibbs, Jr., Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed July 28, 1975, Ser. No. 599,942
Int. Cl.² B24D 3/34; C23C 17/02
U.S. Cl. 51—295 6 Claims

5. An abrasive particle consisting essentially of cubic boron nitride particle having a rough adherent flaky granular covering, said covering consisting essentially of an outside surface coating ranging in composition from metal to a mixture of boride and nitride of said metal with all mixtures of said metal and metal boride and nitride falling within said range, and a layer of a mixture of boride and nitride of said metal intermediate said surface coating and said cubic boron nitride particle bonding said surface coating to said cubic boron nitride particle, said metal being selected from the group consisting of molybdenum, tungsten, titanium, niobium, tantalum, chromium, zirconium and alloys thereof, said covering ranging in structure from non-uniform to substantially uniform and from discontinuous to continuous and covering from at least 50 percent to about 100 percent of the surface area of said cubic boron nitride particle.

4,011,065

PROCESS FOR THE ENRICHMENT OF GASES

Heinrich Münzner, Essen-Kray; Heinrich Heimbach, Bochum; Werner Körbächer, Essen-Borbeck; Werner Peters, Wattenscheid; Harald Juntgen, Essen-Heisingen; Karl Knoblauch, Essen, and Dieter Zündorf, Essen-Heisingen, all of Germany, assignors to Bergwerksverband GmbH, Essen, Germany

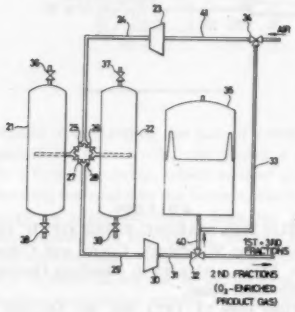
Continuation-in-part of Ser. No. 445,319, Feb. 22, 1974, which is a continuation-in-part of Ser. No. 245,460, April 19, 1972, abandoned, and a continuation-in-part of Ser. No. 161,211, July 9, 1971, Pat. No. 3,801,513. This application Nov. 14, 1974, Ser. No. 523,687

Claims priority, application Germany, Jan. 9, 1974, 2400860

The portion of the term of this patent subsequent to Apr. 2, 1991, has been disclaimed.

Int. Cl.[2] B01D *15/06*

U.S. Cl. 55—25 28 Claims



1. A process for the oxygen-enrichment of air, comprising initially loading at least one adsorber with oxygen by conveying a stream of air into said one adsorber while evacuating an initial effluent gas from said one adsorber, said one adsorber adsorbing oxygen preferentially to nitrogen, and said initial effluent gas initially having a proportion of oxygen which is less than the proportion of oxygen in said air stream; terminating said initial loading when the proportion of oxygen in said initial effluent gas approximates the proportion of oxygen in said air stream; thereafter additionally loading said one adsorber with oxygen by conveying a nitrogen-containing gas stream having substantially 25 to 70 percent by volume of oxygen into said one adsorber while evacuating another effluent gas from said one adsorber, said other effluent gas initially having a proportion of oxygen which at most approximately equals the proportion of oxygen in said air stream; terminating said additional loading before the proportion of oxygen in said other effluent gas substantially exceeds the proportion of oxygen in said air stream; thereafter initially unloading said one adsorber by creating an underpressure therein so as to obtain a first fraction which has substantially 25 to 70 percent by volume of oxygen; subsequently further unloading said one adsorber at an underpressure so as to obtain a second fraction which has substantially 70 to 95 percent by volume of oxygen; thereafter additionally unloading said one adsorber at an underpressure so as to obtain a third fraction which has substantially 25 to 70 percent by volume of oxygen; recovering said second fraction as product gas; and using at least a portion of the total of said first and third fractions in a step similar to said additional loading step.

4,011,066

PROCESS OF PURIFYING GASES PRODUCED BY THE GASIFICATION OF SOLID OR LIQUID FOSSIL FUELS

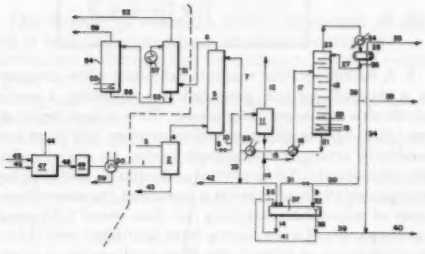
Karl Bratzler, Bad Homburg; Alexander Doerges, and Manfred Kriebel, both of Frankfurt am Main, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 7, 1975, Ser. No. 593,915

Claims priority, application Germany, Jan. 29, 1975, 2503507

Int. Cl.[2] B01D *19/00*

U.S. Cl. 55—44 7 Claims



1. In a process of purifying gases produced by a gasification of fossil fuels by treatment with water vapor and oxygen under superatmospheric pressures to remove catalystdeteriorating impurities, such as mono- and polyunsaturated hydrocarbons, mercaptans, HCN, HCl, H_2S, CS_2, COS, and NH_3, and to desulfurize the gas, to produce an exhaust gas which is rich in H_2O, wherein the gas is cooled and scrubbed under superatmospheric pressures at normal temperatures while the raw gas, at a temperature of 150°–170° C, is indirectly cooled to ambient temperatures, the condensible hydrocarbons are separated and removed, the gas is scrubbed with water to remove ammonia in a first scrubbing stage in which the rate of water addition is controlled to be just sufficient to remove the ammonia, the gas is then scrubbed with a highboiling organic solvent which is miscible with water and to which sulfur is added, in a second scrubbing stage in which the rate of solvent addition is controlled in dependence on the solubility of the methylmercaptan, which is to be removed, in the solvent, the gas is subsequently scrubbed with the same solvent in a third scrubbing stage in which the water content of the solvent is kept at 5–30 mole percent H_2O and in which H_2S and COS are entirely and selectively removed from the gas, and the scrubbing agents from the second and third scrubbing stages are separately regenerated and recycled to the second and third scrubbing stages for re-use, the improvement which comprises

flashing the scrubbing agent used in the second scrubbing stage approximately to atmospheric pressures, adding water, if desired, heating the scrubbing agent to the boiling temperature but not in excess of 170° C, treating the scrubbing agent in a stripping column with water vapor or stripping gas to remove liquid impurities, condensing the mixed vapors, isolating the condensates by phase separation, and feeding part of the aqueous phase as a reflux to the upper portion of the stripping column while the stripped scrubbing agent is cooled and is fed back to the top of the second scrubbing stage.

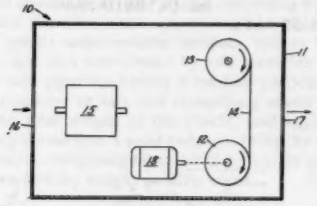
4,011,067
FILTER MEDIUM LAYERED BETWEEN SUPPORTING LAYERS

Patrick H. Carey, Jr., Bloomington, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 437,880, Jan. 30, 1974, abandoned. This application Sept. 11, 1975, Ser. No. 612,460

Int. Cl.² B01D *46/18*

U.S. Cl. 55—354 **21 Claims**



1. A multilayer filter medium exhibiting a low pressure drop at a desired particle penetration comprising a preformed handleable self-supporting porous fibrous base layer; at least one thin lightweight non-self-supporting filtration layer of randomly arranged microfibers having an average diameter less than about 0.5 micrometer collected on said base layer by interposing the base layer in a stream of the microfibers, said layer of microfibers weighing less than about 0.01 pound per square yard; and a porous top layer laminated over the layer of microfibers so as to unify the filter medium into a single handleable self-supporting sheet material; said base and top layers contributing less than 20 percent of the pressure drop through the filter medium at a face velocity of 100 feet per minute; and said layer of microfibers having a relationship of initial particle penetration to pressure drop when tested at a face velocity of 100 feet per minute within the range defined by curves C and D shown in FIG. 3.

4,011,068
PARTICLE SEPARATOR

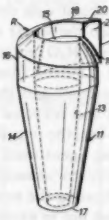
Richard Penderell Llewelyn, Cheltenham, Australia, and John Austin Hart, Lymm, England, assignors to State Electricity Commission of Victoria Commonwealth of Australia, Melbourne, Australia

Continuation-in-part of Ser. No. 314,165, Dec. 11, 1972, Pat. No. 3,883,332. This application Feb. 28, 1975, Ser. No. 553,973

The portion of the term of this patent subsequent to May 3, 1992, has been disclaimed.

Int. Cl.² B01D *45/12*

U.S. Cl. 55—459 D **8 Claims**



1. Apparatus for separating particles from a stream of gas and entrained particles comprising,

an elongate annular duct having an outer tubular wall and an inner tubular wall both extending from an inlet end of the duct through to an outlet end of the duct;

an annular duct roof on the inlet end of the duct;

an inlet to the duct to direct said stream into the inlet end of the duct so that it flows with swirling motion through to the outlet end of the duct; and

outlet means to divide an inner part of the flow at the outlet end of the duct from particles in the outer region of the flow; wherein

said inlet has a roof, a floor and inner and outer walls connecting the roof and floor so as to define a single inlet passage separate from the annular duct; and

wherein the inner and outer walls of the inlet converge in the direction of flow and smoothly join the inner and outer walls of the duct respectively;

the roof of the inlet joins smoothly on to the roof of the duct;

the floor of the inlet and the smoothly continuous inlet and duct roofs become continuously less transverse to the axis of the duct in the direction of flow;

the roof of the duct, after one revolution around the duct, joins smoothly with the floor of the inlet at the entrance to the annular duct; and

the inlet is of contracting cross-section in the direction of flow.

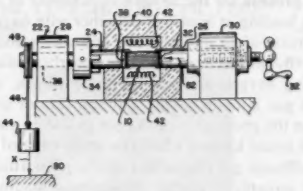
4,011,069
APPARATUS FOR MAKING FIBER OPTIC DEVICES

Henry B. Cole, East Woodstock, Conn., and Colin K. Yates, Sturbridge, Mass., assignors to American Optical Corporation, Southbridge, Mass.

Filed June 11, 1971, Ser. No. 155,665

Int. Cl.² C03B *37/02*

U.S. Cl. 65—11 R **6 Claims**



1. Apparatus for making shortened fiber optic image inverters comprising:

a furnace having thermostatically controlled heating means for heating the intermediate section and opposite ends respectively of a bundle of optical fibers to controlled different temperatures suitable for twisting said bundle, said opposite ends of said bundle being heated to lower temperatures than said intermediate section;

a pair of high heat-resistant endpieces attachable to said opposite ends of said bundle of fibers, said endpieces being adapted to extend into said furnace with said bundle of fibers held thereby;

a headstock for supporting one endpiece and a tailstock for supporting the other endpiece;

means for rotating one of said endpieces relative to the other for twisting said bundle of fibers held thereby when said bundle is heated in said furnace; and

means for moving one endpiece toward the other for compressing said heated bundle of fibers to effect axial shortening thereof.

4,011,070

METHOD AND APPARATUS FOR REGULATING MOLTEN GLASS FLOW INTO A CONDITIONING CHAMBER

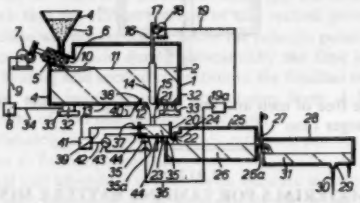
William Christie Hynd, Lymm, England, assignor to Pilkington Brothers Limited, St. Helens, England

Filed Oct. 3, 1975, Ser. No. 619,160

Claims priority, application United Kingdom, Oct. 22, 1974, 45701/74

Int. Cl.² C03B 5/24

U.S. Cl. 65—29 24 Claims



1. A method of controlling the rate of continuous flow of molten glass from a reservoir, comprising a glass melting furnace, to a forming process, which method comprises feeding glass forming material into the furnace, discharging molten glass through an adjustable outlet from the furnace to an intermediate vessel, and discharging molten glass from an outlet in the intermediate vessel into a third vessel from which molten glass is removed for use in the forming process, said method further comprising sensing the temperature of the glass discharged from the outlet of the furnace, sensing the temperature of glass in the intermediate vessel and maintaining the temperature of the glass in the intermediate vessel at a value which is fixed in relation to the temperature of the glass discharging from the furnace, continuously determining the quantity of glass in the intermediate vessel, generating a control signal representing any change in said quantity of glass in the intermediate vessel, and employing that control signal to adjust the rate of flow of molten glass through the outlet from the furnace so as to maintain a predetermined rate of flow from the furnace to the intermediate vessel and thereby from the intermediate vessel to the third vessel.

15. Apparatus for controlling the rate of flow of molten glass to a glass forming process, which apparatus comprises a glass melting furnace having adjustable feeding means for feeding material to the furnace, flow control means for regulating the rate of flow of molten glass through an outlet from the furnace, means for determining the quantity of glass in the furnace and first temperature sensing means for sensing the temperature of the molten glass discharged from the outlet of the furnace, and an intermediate vessel positioned to receive molten glass discharged from the outlet of the furnace, said intermediate vessel having an outlet for discharging molten glass, second temperature sensing means for sensing the temperature of molten glass in the intermediate vessel and heating means for maintaining the temperature of glass in the intermediate vessel at a value which is fixed in relation to the temperature of the glass discharged from the furnace, and a third vessel arranged to receive molten glass from the outlet in the intermediate vessel, monitoring means being provided and arranged to continuously determine the quantity of glass in the intermediate vessel and generate a signal representing any charge in that quantity, the monitoring means being connected to said adjustable feeding means thereby to adjust the flow of molten glass from the furnace.

4,011,071

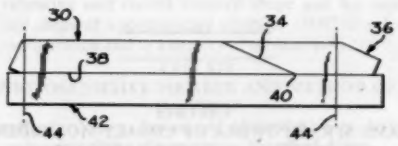
METHOD OF MAKING GLASS SHAVING INSTRUMENT

Walter P. Siegmund, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.

Filed July 10, 1975, Ser. No. 594,826

Int. Cl.² C03C 15/00, 23/20

U.S. Cl. 65—31 1 Claim



1. The method of making a cutting instrument of glass having at least one sharp edge comprising the steps of:

grinding and polishing a first flat surface on a slab of soluble glass;

grinding and polishing a second flat surface on a slab of insoluble glass;

assembling said slabs with one of said first and second flat surfaces placed against the other;

heating the assembly of said slabs to a temperature sufficient to interfacially fuse said first and second surfaces together;

cutting from said assembly at an acute angle across the fused interface of said first and second surfaces a preform, the plane of one side of said preform intersecting said second flat surface of said interface at an acute angle and producing a sharp edge therealong;

grinding and polishing said plane of one side of said preform to an optical flat to render said edge of maximum acuteness;

fusing a second slab of soluble glass to said ground and polished side of said preform to protectively encase said acute edge of said preform;

heating and drawing at least a portion of the fused unit of said preform and second slab of soluble glass in a direction substantially parallel to the direction of extension of said encased edge thereof and into a section of reduced cross-sectional size;

removing said section;

leaching away from said section all remaining soluble glass; and

at any preselected stage of the method following said step of heating and drawing, cutting said section transaxially to a length desired of said instrument.

4,011,072

FLOTATION OF OXIDIZED COPPER ORES

James B. Holman; John A. Cronin, both of Inspiration, Ariz., and Bernhard Lamby, Moers, Germany, assignors to Inspiration Consolidated Copper Company, Inspiration, Ariz.

Filed May 27, 1975, Ser. No. 581,267

Int. Cl.² B03D 1/08; C22B 15/00

U.S. Cl. 75—2 4 Claims

1. The method of recovering copper by froth flotation from an aqueous pulp of an ore containing both sulfide and oxidized minerals of copper which comprises subjecting an aqueous pulp of the ore to a first froth flotation operation in the presence of a collector for sulfide copper minerals, thereby producing a concentrate containing a large proportion of the sulfide copper minerals, then subjecting the residual ore pulp to a further operation which comprises continuously monitoring the EMF of the pulp, adding a water-soluble sulfide to the pulp in an amount from 0.05 to 7 pounds contained sulfur per ton of ore whenever and for so long as the pulp EMF rises above about −30 millivolts with reference to a silver-silver chloride standard electrode and discontinuing such addition

whenever such EMF becomes less than about −30 millivolts, and thereafter subjecting the pulp to a second froth flotation operation in the presence of a collector for copper sulfide minerals, thereby producing a concentrate containing much of the remaining sulfide copper minerals and a substantial part of the oxidized copper minerals of the ore.

4,011,073

FLAME SPRAY POWDER OF COBALT-MOLYBDENUM MIXED METAL AGGLOMERATES USING A MOLYBDENUM SALT BINDER AND PROCESS FOR PRODUCING SAME

John Allen Powers, New Albany; Martin Benedict MacInnis, Towanda, and David John Port, Athens, all of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed July 2, 1975, Ser. No. 592,476
Int. Cl.² C22F *9/00*
U.S. Cl. 75—.5 BB **5 Claims**

1. A flame spray powder consisting essentially of particle agglomerates of finely divided particulates of a metal selected from the group consisting of molybdenum and its alloys, and a compound of cobalt selected from the group consisting of cobalt oxides, cobalt hydroxides and cobalt oxalates, the agglomerates held together by at least one binder consisting essentially of spray dried ammonium molybdate, the spray dried ammonium molybdate being present in an amount equivalent to at least 5 weight percent of molybdenum trioxide based on total weight of powder, whereby upon heating in a reducing atmosphere the spray dried ammonium molybdate and the cobalt compound are reduced to base metal.

3. Process for producing a flame spray powder comprising (a) spary drying a slurry of finely divided particulates of a metal selected from the group consisting of molybdenum and its alloys, and a compound of cobalt selected from the group consisting of cobalt oxides, cobalt hydroxides and cobalt oxalates, in an aqueous solution of a least one binder consisting essentially of ammonium molybdate in an amount equivalent to at least 5 weight percent of molybdenum trioxide based on the total weight of the powder, whereby particle agglomerates of the particulates are formed, held together by the spray dried ammonium molybdate; (b) classifying the agglomerates to obtain agglomerates within a desired particle size distribution; and (c) subjecting agglomerates outside the desired particle size distribution to at least one recycling operation, said recycling comprising reslurrying out-sized agglomerates, spray drying the reslurry to reform agglomerates, and classifying the reformed agglomerates.

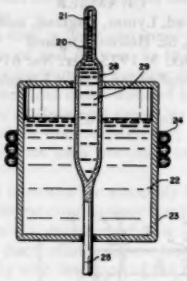
4,011,074

PROCESS FOR PREPARING A HOMOGENEOUS ALLOY

Josef Dietl, and Josef Jarosch, both of Munich, Germany, assignors to Consortium fur Elektrochemische Industrie GmbH, Munich, Germany

Continuation-in-part of Ser. No. 454,517, March 25, 1974, abandoned. This application Jan. 26, 1976, Ser. No. 652,273
Int. Cl.² C22C *1/00*
U.S. Cl. 75—135 **4 Claims**

1. In a process for making a homogeneous solidified alloy having at least one component with a comparatively high vapor pressure, in which the alloy components are enclosed in the form of a homogeneous melt in a sealed ampoule and cooled therein, the improvement that the volume free of melt in said ampoule is during the entire cooling step of the melt between 0.001 and 1 cc, and the ratio of the volume of the



ampoule free of melt and that of the ampoule filled with melt is not larger than 1:5.

4,011,075

MATERIALS FOR TAMPING BATTERY MIX

Misao Watanabe, Nikko; Yasuji Fujii, Yokohama, and Kiyoshi Takayanagi, Tokyo, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 271,517, July 13, 1972, abandoned. This application Aug. 19, 1974, Ser. No. 498,616
Claims priority, application Japan, July 16, 1971, 46-52862
Int. Cl.² C22C *19/05, 19/07, 14/00*
U.S. Cl. 75—171 **6 Claims**

1. A tamping device for use in the tamping of dry battery mix of the Lechanche-type and manganese alkaline type consisting of an alloy of CoTi composed of 60 – 40 atomic % of titanium, about 0.5 to 5 atomic % of molybdenum, the balance being Co, and having good corrosion resistance against Leclanche-type or manganese-alkaline dry battery mix.

4,011,076

METHOD FOR FABRICATING BERYLLIUM STRUCTURES

Victor M. Hovis, Jr., Kingston, and Walter G. Northcutt, Jr., Oak Ridge, both of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 18, 1976, Ser. No. 668,023
Int. Cl.² B22F *3/00*
U.S. Cl. 75—211 **5 Claims**

1. A method for fabricating a thin-walled beryllium structure, comprising the steps of preparing a mixture of beryllium powder and elemental silicon powder with a concentration of silicon in a range of about 2500 to 4000 ppm, plasma spraying the mixture onto a substrate, removing the sprayed body from the substrate, exposing the plasma-sprayed body to a moist atmosphere for a duration sufficient to effect absorption of liquid water therein, confining the sprayed body within a sizing die having coefficient of thermal expansion substantially similar to that of beryllium, out-gassing the plasmasprayed body in vacuum at an elevated temperature, and thereafter sintering the plasma-sprayed body in an inert atmosphere.

4,011,077

COPPER COATED, IRON-CARBON EUTECTIC ALLOY POWDERS

Sydney M. Kaufman, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed June 6, 1975, Ser. No. 584,562
Int. Cl.² B22F *3/16*; C22C *1/04*
U.S. Cl. 75—212 **16 Claims**

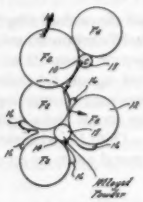
1. A method for preventing solid state carbon diffusion in powder metallurgy techniques at elevated temperatures, comprising:

a. prepare at least a first hypoeutectic carbon iron based powder collection and a second hypereutectic carbon metal powder collection, each containing dissolved carbon with said first collection having a carbon content exceeding the carbon content of said second powder collection by at least 0.5% by weight,

b. impart a thin envelope about substantially all particles of one of said powder collections, said envelope being comprised of a metal having a melting point lower than but substantially close to the melting point of said one powder collection, said metal being characterized by having a diffusivity for carbon therethrough in the solid state and being completely soluble in said one powder collection when the latter is in the molten state, said diffusivity being such that the carbon content of said second powder collection will not recede to below the eutectic point for said second collection during substantially the time involved in heating said second collection to the liquidus temperature, said envelope metal constituting from .1-1.5% by weight of said one powder collection,

c. intimately and homogeneously mix said powder collection to form an admixture, and

d. heat said admixture to provide an increase in temperature of the collections up to substantially the initial liquidus temperature for said first powder collection, said envelope preventing a carbon diffusion from one collection to the other during said temperature increase below the liquidus temperature, and hold said heated condition at about the liquidus temperature for said one powder collection to dissolve said envelope metal and to permit diffusion alloying and carbon exchange between said powder collections.



5. A method making iron alloys, comprising:

a. providing a low carbon iron base powder and an iron alloy powder containing essentially a eutectic amount of carbon,

b. thinly coat the surfaces of each particle of at least said alloy powder with a metal effective to act as a substantial barrier against carbon diffusion when said alloy powder is in the solid state, said barrier metal having a melting point lower than said iron alloy powder,

c. intimately and homogeneously blend said base and coated alloy powders,

d. compact said blended powders to a self-supporting green strength, and

e. heat said compact to the liquidus temperature of said alloy powder and maintain said liquidus temperature for a period of time to permit carbon and alloy diffusion to take place between the powders to a stabilized value.

11. A method of making powdered parts, comprising:

a. providing an iron-carbon-alloy powder in a particle size range of −100 +325 having a hypereutectic amount of carbon,

b. coating said iron-carbon-alloy powder with copper by subjection to abrasive action of copper elements impacted with the particles of said iron-carbon-alloy powder,

c. mixing said coated iron-carbon-alloy powder with a base iron powder having a hypoeutectic amount of carbon and having a lower carbon content than said iron-carbon-alloy powder,

d. compacting said mechanically mixed powders under ambient temperature conditions and under a pressure of 30 tsi to a density of 6.6 g./cc. rendering a compact having a green strength of at least 1200 psi,

e. subjecting said compact to liquid phase sintering under a protective atmosphere at a temperature in the range of 2060–2100 °F for a period of 20 minutes,

f. allowing said sintered product to cool, and

g. reheating said cooled sintered shape and hot working said shape at a temperature of about 1800° to a desired configuration and to a density of substantially 100%.

4,011,078

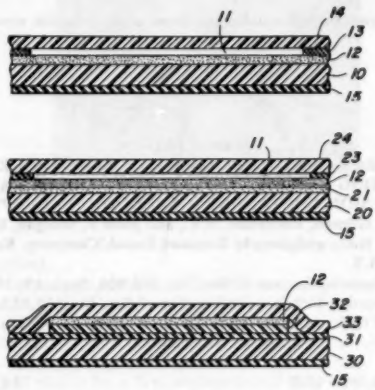
PHOTOSENSITIVE MEMBER AND METHOD OF IMAGING

Satoru Honjo, Tokyo, Japan, and Masamichi Sato, Urbana, Ill., assignors to Xerox Corporation, Stamford, Conn.

Filed Jan. 14, 1972, Ser. No. 217,845

Int. Cl.² G03G *13/22*

U.S. Cl. 96—1 R **5 Claims**



1. A xerographic photosensitive member which comprises an opaque substrate with an adhesive backing on one side and a light sensitive photoconductive insulating layer suitable for use in electrophotography on the other side, said photoconductive layer, in turn, having an opaque overlayer removably attached with an intermediate adhesive layer disposed at the edges between the opaque overlayer and the photoconductive layer resulting in the formation of a narrow opening between said opaque overlayer and said photoconductive layer.

4,011,079

METHOD FOR PRODUCING AN ELECTROPHOTOGRAPHIC RECORDING MATERIAL

Johannes Berle, Ruthen; Hartmut Dülken, Belecke; Gottfried Guder, Belecke, and Karl-Heinz Kassel, Belecke, all of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Aug. 1, 1974, Ser. No. 493,889

Claims priority, application Germany, Aug. 2, 1973, 2339115

Int. Cl.² G03G *5/04*

U.S. Cl. 96—1.5 **12 Claims**

1. A method for producing an amorphous electrophotographic recording material of selenium, selenium compounds, or alloys with selenium, wherein the selenium, selenium compounds, or alloys with selenium are present only in amorphous form, by depositing the recording material on a conductive carrier, comprising the steps of applying, by vapor depositing, a photoconductive layer on the conductive carrier at a first temperatuure range below the glass transformation temperature, and then heating the photoconductive layer on the conductive carrier at a higher second temperature range the lower limit of which is the glass transformation temperature of the photoconductive layer and the upper limit of which is the temperature just below that at which the electrophotographic properties begin to change.

4,011,080

ELECTROPHOTOGRAPHIC ELEMENTS COMPRISING POLYSILICIC ACID-CROSSLINKED CONDUCTIVE POLYMERS

John Murray McCabe, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 447,421, March 1, 1974, abandoned. This application Aug. 30, 1974, Ser. No. 502,259

Int. Cl.² G03G *5/04*

U.S. Cl. 96—1.5 **24 Claims**

1. A photographic element comprising a conductive layer comprising a conductive polymer having an electrical resistivity of 1×10^{10} ohm/sq. or lower crosslinked with hydrolyzed tetraethyl orthosilicate through an

group,

and having on the conductive layer a silver halide emulsion layer.

4,011,081

DIRECT-POSITIVE DOUBLE EXPOSURE PROCESS UTILIZING A PRIMITIVE, UNFOGGED SILVER HALIDE EMULSION CONTAINING AN ELECTRON ACCEPTOR

Paul B. Gilman, Rochester, N.Y., and John V. Morgan, Burnsville, N.C., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 398,906, Sept. 19, 1973, abandoned, which is a continuation of Ser. No. 154,155, June 17, 1971, abandoned. This application Mar. 3, 1975, Ser. No. 554,932

Int. Cl.² G03C *5/32*, *5/24*

U.S. Cl. 96—45.2 **4 Claims**

1. A process for producing a direct-positive image in a silver halide photographic element comprising

1. imagewise exposing for at least 0.01 second at an intensity of at least 1×10^{-12} watt/cm² a photographic element comprising a support and coated theron at least one layer of a primitive, silver halide emulsion which contains 1 mg to 2 grams per mole of silver of an electron-accepting compound having a cathode halfwave potential more positive than −1.0 volt and an anodic halfwave potential more positive than +0.4 volt, said emulsion being derived from precipitation of an alkali metal halide and a water soluble silver salt in contact with a peptizer and in the absence of chemical or physical sensitizing conditions, the silver halide emulsion in the absence of exposure exhibiting a density of less than 0.3 when processed for 5 minutes at 27° C in a photographic developer having the following composition:

water	500.0 cc
N-methyl-p-amino-phenol sulfate	2.0 g
sodium sulfite	90.0 g
hydroquinone	8.0 g
sodium carbonate, monohydrated	52.5 g
potassium bromide	5.0 g
water to make	1.0 liter

2. exposing said imagewise-exposed silver halide emulsion to an overall flash for less than 0.05 second at an intensity at least 10 times greater than the imagewise exposure and
3. developing said photographic element in silver halide surface-image developer which is substantially free of silver halide solvent.

4,011,082

SILVER HALIDE PHOTOGRAPHIC MATERIAL

Takeo Sakai; Masakazu Yoneyama, and Nobuo Yamamoto, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

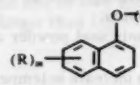
Filed June 6, 1975, Ser. No. 584,674

Claims priority, application Japan, June 6, 1974, 49-64437

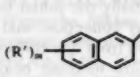
Int. Cl.² G03C *1/06*, *5/30*, *1/28*, *1/38*

U.S. Cl. 96—95 **12 Claims**

1. A silver halide photographic material comprising a support having thereon at least one hydrophilic colloid containing silver halide emulsion and including at least one polyethylene oxide naphthyl ether represented by the following general formulae (I) and (II)



(I)



(II)

wherein R and R′ each represents a hydrogen atom or an alkyl group containing 1 to 18 carbon atoms, *m* is an integer of 1 or 2, and *n* is an integer of from 10 to 150, and at least one anionic surface active agent, wherein said anionic surface active agent is a compound containing a hydrophobic group having 8 to 30 carbon atoms and a sulfonic acid group of the formula $-SO_3M$ or $-OSO_3M$, wherein M represents a hydrogen atom, an alkali metal atom or an ammonium group.

4,011,083

SURFACE SENSITIVE SILVER HALIDE EMULSION CONTAINING A SILVER COMPLEXING AZAINDENE TO REDUCE DESENSITIZATION OF OPTICAL SENSITIZING DYE INCORPORATED THEREIN

Maurice Francis Durning, Rochester, and John Edward Starr, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 531,277, Dec. 10, 1974, abandoned, which is a continuation-in-part of Ser. No. 293,963, Oct. 2, 1972, abandoned. This application July 26, 1976, Ser. No. 708,818

Int. Cl.² G03C *1/34*, *1/20*

U.S. Cl. 96—109 **14 Claims**

1. A surface-sensitive photographic silver halide emulsion having a pAg of about 6.0 to 8.5, said emulsion containing

a. at least one photographic infrared spectral sensitizing dye capable of sensitizing said silver halide emulsion to radiation longer than about 700 nm, said dye being a methine dye having a polarographic cathodic halfwave potential more positive than about −1.20 volts and a polarographic anoidic halfwave potential more negative than about +0.6 volts, said dye being employed in said emulsion at a concentration which results in at least about 0.3 log E desensitization of a test portion of said emulsion, when said test portion of said emulsion is coated on a support and sensitometrically exposed to light to which said silver halide emulsion is intrinsically sensitive and developed for 6 minutes at 20° C in Kodak D-19 developer; and

b. a silver complexing axaindene which forms a silver salt with a solubility product between that of silver chloride (1.6×10^{-10} at 25° C) and silver bromide (7.7×10^{-13} at 25° C) in an amount effective to reduce the desensitization caused by said dye.

4,011,084

FLUID PHOTO-CROSSLINKABLE COMPOSITIONS FOR THE MANUFACTURE OF RELIEF PRINTING PLATES

Heinrich Hartmann, Limburgerhof; Gerhard Hoffmann, Speyer; Helmut Barzynski, Bad Durkheim; August Lehner, Roedersheim-Gronau; Werner Lenz, Ludwigshafen; Herbert Stutz, Karlsruhe, and Heinz-Ulrich Werther, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Sept. 10, 1975, Ser. No. 612,010

Claims priority, application Germany, Sept. 13, 1974, 2443786

Int. Cl.² G03C 1/68

U.S. Cl. 96—115 P 8 Claims

1. A fluid, photo-crosslinkable composition for use in the manufacture of a laminate and comprising a photoinitiator and a mixture of the following materials in the following proportions:

A. from 40 to 80 percent by weight of a soluble, olefinically unsaturated isocyanate group-free polyurethane which has a molecular weight of from 400 to 10,000, and which has been manufactured by reaction of

A1. one or more soluble olefinically saturated polyesters having a hydroxyl number of from 100 to 300 and derived from a saturated polyhydric aliphatic alcohol of 2 to 8 carbon atoms and a saturated dicarboxylic acid of 4 to 8 carbon atoms or from a mixture thereof containing corresponding unsaturated alcohol and/or acid components in an amount such that the mixture contains at least 50 mole percent saturated aliphatic compounds with (A2) a polyisocyanate of 6 to 36 carbon atoms and (A3) a monoacrylate and/or monomethacrylate of an aliphatic diol of 2 to 10 carbon atoms, and

B. from 20 to 60 percent by weight of at least one photopolymerizable C_6 to C_8 N-vinyllactam monomer or a mixture of at least 20% by weight thereof with at least one other photopolymerizable monomer.

8. A process for the production of relief printing plates by image-wise exposing to actinic light the photocrosslinkable layer of a laminate comprising a substrate and a photo-crosslinkable layer of a composition consisting essentially of a photoinitiator and a mixture of the following materials in the following proportions:

A. from 40 to 80 percent by weight of a soluble, olefinically unsaturated isocyanate group-free polyurethane which has a molecular weight of from 400 to 10,000, and which has been manufactured by reaction of

A1. one or more soluble olefinically saturated polyesters having a hydroxyl number of from 100 to 300 and derived from a saturated polyhydric aliphatic alcohol of 2 to 8 carbon atoms and a saturated dicarboxylic acid of 4 to 8 carbon atoms or from a mixture thereof containing corresponding unsaturated alcohol and/or acid components in an amount such that the mixture contains at least 50 mole percent saturated aliphatic compounds with (A2) a polyisocyanate of 6 to 36 carbon atoms and (A3) a monoacrylate and/or monomethyacrylate of an aliphatic diol of 2 to 10 carbon atoms, and

B. from 20 to 60 percent by weight of at least one photopolymerizable C_6 to C_8 N-vinyllactam monomer or a mixture of at least 20% by weight thereof with at least one other photopolymerizable monomer, and thereafter removing the material from the unexposed areas of said layer.

4,011,085

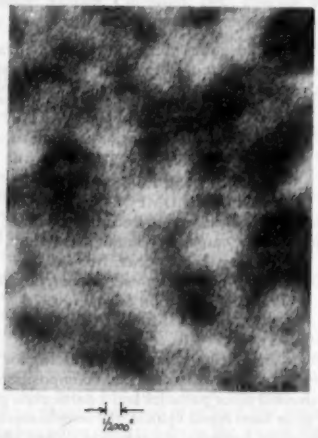
LITHOGRAPHIC PRINTING PROCESS

Sidney L. Rapoport, Lagrangeville, and Douglas F. Mitchell, Brooklyn, both of N.Y., assignors to Rapoport Printing Corporation, New York, N.Y.

Filed Oct. 2, 1974, Ser. No. 511,293

Int. Cl.² B41M 1/18

U.S. Cl. 96—116 19 Claims



1. A method for producing a photolithographic screen comprising,

a. interposing a transparent plate between a light source and a photographically sensitive surface,

b. said transparent plate having a large plurality of light disruptive projections on at least one of its surfaces,

c. exposing said photographically sensitive surface to said light source for a first predetermined time interval,

d. developing said exposed photographically sensitive surface to produce a negative photographic transparency,

e. interposing said negative transparency between a second photographically sensitive surface and a light source,

f. exposing said second photographically sensitive surface to said light source for a second predetermined time interval,

g. developing said exposed second photographically sensitive surface to produce a positive transparency,

h. said second predetermined time interval being chosen to result in a positive transparency having a transparency factor from about 0.25 to about 0.60 when said second photographically sensitive surface is developed to an optical density of from about 0.17 to about 1.6.

4,011,086

PHOTOGRAPHIC EMULSIONS AND ELEMENTS CONTAINING RIGIDIZED CARBOCYANINE DYES

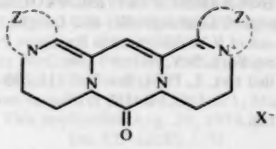
Joseph Michael Simson, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 14, 1975, Ser. No. 621,903

Int. Cl.² G03C 1/18

U.S. Cl. 96—136 6 Claims

1. A photographic silver halide emulsion containing a completely rigidized dye having the formula:



wherein:

a. Z represents the atoms necessary to complete a heterocyclic nucleus selected from the group consisting of an imidazole nucleus, an oxazole nucleus, a thiazole nucleus, a selenazole nucleus and a quinoline nucleus, and

b. X^- represents an anion.

4,011,087

SILVER COMPOSITIONS

Oliver Alton Short, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 2, 1974, Ser. No. 466,419

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² H01B *1/02*

U.S. Cl. 106—1 **4 Claims**

1. In silver metallizing compositions useful for producing silver patterns on glass substrates, said compositions comprising finely divided silver particles and a particulate glass binder dispersed in an inert liquid vehicle, the improvement comprising, as said silver particles, silver-halide coated silver.

4,011,088

ANTI-CORROSIVE COATING COMPOSITIONS

Hiroshi Makishima, Tokohama; Minoru Hoshino, Yokohama; Toshio Shinohara, Fujisawa; Hiroshi Nii, Kamakura; Minoru Hosoda, and Toshiharu Hayashi, both of Yokohama, all of Japan, assignors to Dai Nippon Toryo Kabushiki Kaisha, Osaka, Japan

Filed Dec. 16, 1974, Ser. No. 533,359

Claims priority, application Japan, July 30, 1974, 49-86644

Int. Cl.² C09D *5/10*

U.S. Cl. 106—1 **5 Claims**

1. A water-soluble anti-corrosive coating composition having improved weldability, which comprises (1) 5 to 80% by weight (as calculated as solids) of a binder composed of at least one member selected from potassium silicate of $K_2O \cdot n SiO_2$ wherein n is from 2.5 to 4.0 and organic ammonium silicate and (2) 20 to 95% by weight (as calculated as solids) of a mixture of zinc powder with at least one member selected from iron phosphide and nickel phosphide in which the weight ratio of zinc powder to phosphide is within a range of from 8 : 2 to 2 : 8.

4,011,089

PHOSPHAZENE COMPOSITION

James T. F. Kao, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation of Ser. No. 480,734, June 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 339,902, March 9, 1973, abandoned, and a continuation-in-part of Ser. No. 369,221, June 12, 1973, which is a continuation-in-part of Ser. No. 339,902,. This application June 16, 1975, Ser. No. 586,987

Int. Cl.² C09D *5/18*; **C08L** *1/24*

U.S. Cl. 106—15 FP **2 Claims**

1. Regenerated cellulose filaments and filamentary articles having dispersed therein a flame retardant amount of a phosphonitrilate polymer prepared by an improved process including the steps of (a) heating a phosphonitrilic halide with at least a stoichiometric amount of an alkali metal compound of the formula MOR, wherein M is an alkali metal and R is an organic radical having up to about 8 carbon atoms to produce a phosphonitrilate polymer, (b) reacting a phosphonitrilic halide with less than the stoichiometric amount of said alkali metal compound producing a phosphonitrilate polymer containing a substantial amount of residual halide groups, and (c) heating the phosphonitrilate polymer of (a) with the phosphonitrilate polymer containing a substantial amount of residual halide groups of (b) under conditions sufficient to drive off an organic halide, the improvement comprising preparing at least one of the polymers of (a) and (b) by a process of adding said alkali metal compound to said phosphonitrilic halide so that from about 0.1 to about 5 weight percent of alkali metal is retained in the resultant phosphonitrilate polymer as a P—O—M group, said phosphonitrilic halide being contained in an inert solvent such that during the reaction a substantial excess of said phosphonitrilic halide is maintained, whereby the viscosity of the resultant phosphonitrilate polymer and its average molecular weight are increased.

4,011,090

AQUEOUS AMMONIACAL ZINC OXIDE COMPOSITIONS FOR LUMBER TREATMENT

Michael R. Clarke, and Raman L. Desai, both of Ottawa, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Continuation-in-part of Ser. No. 356,355, May 2, 1973, Pat. No. 3,945,834. This application Apr. 14, 1975, Ser. No. 567,886

Claims priority, application Canada, Sept. 1, 1972, 150792

Int. Cl.² B27K *3/32*, *3/52*; **C09D** *5/14*

U.S. Cl. 106—15 R **10 Claims**

1. A wood treating composition comprising an aqueous solution containing:

a. zinc ion, in a total amount, in the solution, of from about 0.5 to about 10% by weight, as zinc;

b. ammonium thiocyanate, in an amount of from about 1 to about 28% by weight, with the mole ratio calculated as NH_4CNS/Zn being from about 2 to about 3;

and

c. ammonia, in an amount of from about 0.1 to about 28%, sufficient to provide a ratio of ammonia to zinc of at least about 0.1 to about 1, the composition having a pH of about 9 or more.

4,011,091

CERAMIC MATERIALS CONTAINING KEATITE

Howard L. McCollister, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Aug. 13, 1975, Ser. No. 604,509

Int. Cl.² C03C *3/22*, *15/00*

U.S. Cl. 106—39.7 **23 Claims**

17. The low expansion, thermally stable, ceramic article consisting essentially of keatite as the predominant crystalline phase together with about 15% by weight to about 32% by weight of mullite on the basis of SiO_2 and Al_2O_3, which article has been formed by the acid leaching of a lithium aluminosilicate crystalline article consisting essentially of:

Component	Weight %
SiO_2	72–83
Al_2O_3	11–21
Li_2O	3.0–5.0

When the SiO_2/Al_2O_3 molar ratio is from about 6 to 7.5, the Li_2O/Al_2O_3 molar ratio is from about 0.65 to 0.85;

When the Sio_2/Al_2O_3 molar ratio is from about 7.5 to 9, the Li_2O/Al_2O_3 molar ratio is from about 0.85 to 0.97; and

When the SiO_2/Al_2O_3 molar ratio is from 9 to 12,

the LiO_2/Al_2O_3 molar ratio is from about 0.87 to about 0.97; and containing keatite solid solution as the predominant crys-

talline phase to produce an hydroxy aluminosilicate structure, and dehydrating said hydroxy aluminosilicate structure to form said ceramic article.

4,011,092

STANNOUS SULFATE AND GYPSUM MIXTURE AS A RETARDER IN GRINDING PORTLAND CEMENT AND BLENDED HYDRAULIC CEMENT FOR IMPROVING THE QUALITY OF THE CEMENT, MORTAR AND CONCRETE

Sing Tsze Yue, 129 Wanda Court, Santa Cruz, Calif. 95065

Filed Feb. 11, 1976, Ser. No. 657,160
Int. Cl.² C04B 7/02, 7/35
U.S. Cl. 106—89 11 Claims

1. A process for producing a cement mixture comprising:
1. a base of cement clinker;
2. mixing a retarder of not more than 3% of gypsum and from about 0.5 to 5.0% stannous sulfate based on the dry weight of the cement clinker, with the latter and;
3. grinding the mixture to form a fine homogeneous cement.

4,011,093

SEALANT FOR GLASS-CERAMIC SURFACES

Frank Veres, Sylvania Township, Lucas County, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation of Ser. No. 317,558, Dec. 22, 1972, Pat. No. 3,929,494. This application Jan. 24, 1975, Ser. No. 543,856
Int. Cl.² C03C 3/04, 3/22
U.S. Cl. 106—52 3 Claims

1. A glass consisting essentially of, in weight percent,
SiO_2 — 54–80
Al_2O_3 — 14–32
Li_2O — 3–8
CeO_2 — 1–7
ZnO — 0–9
and not more than about 1 weight percent of other alkali metal oxides, wherein the mole ratio of $(LiO_2 + ZnO) : Al_2O_3$ is from 0.7 to 1.2 and the mole ratio of $Li_2O : ZnO$ is at least 2.

4,011,094

CEMENTITIOUS COMPOSITIONS CONTAINING MAGNESIUM COMPOUNDS TO PROVIDE SAG RESISTANCE

David R. Burley, Cranbury, N.J., assignor to Tile Council of America, Inc., Princeton, N.J.

Filed Jan. 14, 1976, Ser. No. 649,085
Int. Cl.² C08L 91/00
U.S. Cl. 106—93 13 Claims

1. A dry-set mortar composition having improved sag resistance, said composition being capable of admixture with water, which comprises a Portland cement, a water retentive cellulosic material and as an additive to provide improved sag resistance, at least 0.5% by weight, based on the weight of said composition, of a reactive magnesium oxide having an iodine number of greater than twenty.

4,011,095

VISCOSITY STABILIZED SOLUTION OF ETHYL CELLULOSE

Abraham Mertwoy, Dresher, and Henry Gisser, Philadelphia, both of Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 31, 1975, Ser. No. 563,767
Int. Cl.² C08L 1/26
U.S. Cl. 106—183 3 Claims

1. Process for forming a viscosity stabilized solution of ethyl cellulose in n-butyl acetate and ethyl lactate for use with propellant strips of propellant actuated devices, said ethyl cellulose having a viscosity of 70 centipoise before its addition to said n-butyl acetate and said ethyl lactate, comprising

heating a solution of said ethyl cellulose in said n-butyl acetate and said ethyl lactate at about 80°–110° C for at least one hour.

4,011,096

VESICULATED SILICA MICROSPHERES

Lionel Samuel Sandell, Claymont, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 10, 1975, Ser. No. 585,590
Int. Cl.² C04B 31/00
U.S. Cl. 106—288 B 12 Claims

1. Vesiculated silica microspheres consisting essentially of from 0 to 90% by weight of pigment, based on the total weight of the microspheres, and from 10 to 100% by weight of silica, based on the total weight of the microspheres, the microspheres, having an average diameter from 0.5μ to 50μ, the average diameter of the vesicles being 0.1μ to less than 50μ and the volume of the vesicles being from 5 to 95% of the total volume of the microspheres, wherein the vesicles are substantially discrete and spheroidal.

7. Process for preparing vesiculated silica microspheres by the steps of

i. forming an oil-in-water emulsion by contacting a siliceous aqueous phase with a first oil phase,
said siliceous aqueous phase composed of water and at least one silicon compound selected from the group consisting of colloidal silica and alkali metal silicates,
said first oil phase composed of at least one water-immiscible hydrocarbon selected from the group consisting of liquid and low melting aliphatic and aromatic hydrocarbons,
distributed in at least one of said phases is at least one oil-in-water emulsifying agent,

ii. forming an oil-in-water-in-oil emulsion by contacting the oil-in-water emulsion formed in Step (i) with a second oil phase,
said second oil phase composed of a nonionic water-in-oil emulsifying agent and at least one waterimmiscible hydrocarbon selected from the group consisting of aliphatic, aromatic and chlorinated hydrocarbons,

iii. adding acid to the oil-in-water-in-oil emulsion formed in Step (ii), said acid being added in an amount from 0.5 to 2.0 times the amount of said acid needed to react stoichiometrically with the total amount of base present in the siliceous aqueous phase of Step (i) to gel the siliceous aqueous phase and form a slurry of vesiculated silica microspheres, and

iv. separating the vesiculated silica microspheres from the slurry formed in Step (iii).

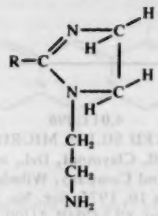
4,011,097

METHOD OF REMOVING IRON SULFIDE AND SLUDGE FROM METAL SURFACES

Thomas L. Sharp, 715 Nenana St., Houston, Tex. 77035

Division of Ser. No. 508,655, Sept. 23, 1974, Pat. No. 3,969,281. This application Dec. 22, 1975, Ser. No. 643,500
Int. Cl.² C23G 1/02
U.S. Cl. 134—3 2 Claims

1. A method of removing iron sulfide and sludge from interior metal surfaces in a glycol system which comprises introducing, onstream, into said glycol system an effective iron sulfide and sludge removing amount of a water and glycol soluble composition comprising:
a. from about 2 to about 15% by weight of a high molecular weight diamine;
b. from about 2.5 to about 18% by weight of acetic acid;
c. from about 1 to about 10% by weight of an organic nitrogen substituted imidazoline of the formula;



wherein R is an alkyl radical.

d. from about 6 to about 15% by weight of a non-ionic surfactant; and

e. from about 2 to about 8% by weight of a quaternary ammonium chloride.

f. from about 1 to about 15% by weight of an alcohol solvent selected from the group consisting of diacetone alcohol and lower aliphatic alcohols; and

g. the remainder, water.

4,011,098

SPILL CONTROL COMPOSITION AND USE THEREOF

James W. Seidenberger, Bethlehem, Pa., assignor to J. T. Baker Chemical Company, Phillipsburg, N.J.

Filed Oct. 22, 1975, Ser. No. 624,592

Int. Cl.² B08B *7/00;* **B01J** *27/20;* **C09K** *3/00*

U.S. Cl. 134—6 **8 Claims**

1. A composition useful for the control and cleanup of a cyanide spill comprising 78 to 82% by weight of powdered ferrous sulfate, and 18 to 22% by weight of an alkali or alkaline earth metal carbonate.

4,011,099

PREPARATION OF DAMAGE-FREE SURFACE ON ALPHA-ALUMINA

Henry W. Gutsche, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Nov. 7, 1975, Ser. No. 629,949

Int. Cl.² B08B *7/00;* **C23G** *1/36*

U.S. Cl. 134—7 **10 Claims**

6. A process for preparing an undamaged surface on alpha-alumina comprising the steps of:

a. shaping the alpha-alumina with a diamond-impregnated saw blade;

b. heating to about 1000° C in oxygen until all traces of diamond are removed;

c. polishing with a colloidal silica fluid under pressure;

d. immersing the alpha-alumina in hydrofluoric acid; followed by

e. rinsing in deionized water.

4,011,100

PIPE CLEANING METHOD AND APPARATUS

Louis Anthony Ralph Ross, 54 Llanvair Drive, South Ascot, Berkshire, England

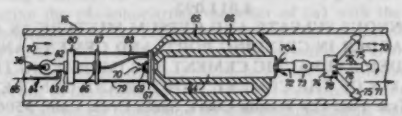
Filed Jan. 13, 1975, Ser. No. 540,385

Claims priority, application United Kingdom, Jan. 21, 1974, 2824/74

Int. Cl.² B08B *9/04*

U.S. Cl. 134—8 **10 Claims**

1. A method of cleaning the inside of a long cylindrical chamber comprising the steps of: introducing into one end of the chamber a cleaning apparatus having a motor, a rotatable scouring head drivable thereby, and an inflatable collar surrounding the motor; a frame rigidly fixed to said motor and said collar, a swivel coupling on said frame, said swivel coupling having a pressure fluid supply connection thereon, and a conduit carried by said frame for supplying fluid under pressure to said inflatable collar through said swivel coupling inflating said collar through said conduit so as to substantially fill the cross-section of the chamber; supplying fluid under pressure into the cylindrical chamber to propel the apparatus



through the chamber and to actuate the motor to rotate the scouring head to thereby scour the inner wall of the chamber, the reaction force to the rotation of the scouring head being provided by friction between the collar and said wall.

4,011,101

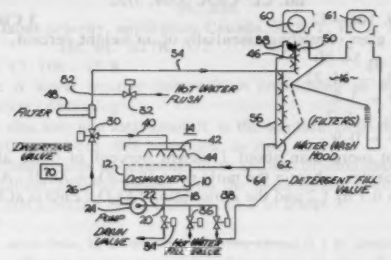
DISHWASHER-WASH HOOD SYSTEM AND METHOD OF OPERATION

George Levenback, Studio City, and Ronald Aaron Marks, Canoga Park, both of Calif., assignors to Elsters Inc., Los Angeles, Calif.

Filed July 28, 1975, Ser. No. 599,600

Int. Cl.² B08B *3/00, 13/00*

U.S. Cl. 134—10 **17 Claims**



8. A method for washing an exhaust hood assembly in combination with a dishwashing assembly and a sump, said exhaust hood assembly including an exhaust duct, an exhaust hood and an exhaust fan, comprising the steps of:

deactivating said exhaust fan;

activating at least one fill valve to deliver a detergent solution to said sump, said fill valve communicating with said sump;

activating a pump and a bypass valve, said bypass valve to divert said detergent solution from said dishwashing assembly to said exhaust hood assembly, said pump to recirculate said detergent solution from said sump through said bypass valve to said exhaust hood assembly and back to said sump;

deactivating said pump;

draining part of said detergent solution into said sump; and

removing said detergent solution from said sump by activating a drain valve coupled to said sump.

4,011,102

WATER-LEVEL REGULATING DEVICE

Gilbert Magnollay, Romanel, Switzerland, assignor to Maillefer S.A., Switzerland

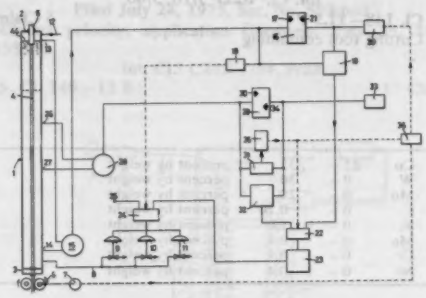
Filed Mar. 22, 1976, Ser. No. 668,921

Int. Cl.² B08B *3/04*

U.S. Cl. 134—57 R **6 Claims**

1. A device for regulating the water level in apparatus for treating an insulated electrical conductor, which device comprises two or more gates actuated by a control signal for filling and emptying said apparatus, a first control circuit having a

broad range of adjustment, a second control circuit having a narrow range of adjustment, and an inverter, each said circuit in turn comprising a first transmitter for producing a measuring signal, a second transmitter for transmitting a reference signal, and a comparator for producing a control signal and transmitting same to said inverter, said inverter supplying said



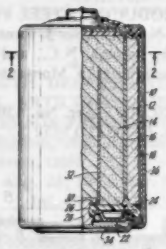
control signal from said comparator of said first or of said second circuit to said gates, said device further comprising means for advancing said insulated conductor, said second transmitter of said first control circuit being connected to said means in such a way that said reference signal transmitted by said second transmitter of said first control circuit is automatically a function of the rate of advance of said conductor.

4,011,103

CATHODE CONTACT MEMBER FOR ALKALINE ROUND CELLS

Karl Victor Kordesch, Lakewood, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Mar. 29, 1976, Ser. No. 671,671
Int. Cl.² H01M 21/06
U.S. Cl. 429—66 **17 Claims**



1. An alkaline round cell comprising, in combination:

a. a metallic cylindrical cell container;

b. a molded tubular cathode shell disposed inside said metallic container, said tubular cathode shell comprising a mixture of finely-divided oxidic depolarizer particles, chemically non-reactive, electrically conductive particles and electrolyte; and

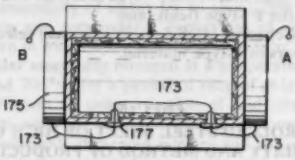
c. a cathode contact member disposed at the interface between said cathode shell and the interior side walls of said metallic container, said cathode contact member being at least partially embedded in the outermost circumferential portions of said tubular cathode shell and making permanent electrical connection with said metallic container.

4,011,104

THERMOELECTRIC SYSTEM

Algerd Basiulis, Redondo Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Oct. 5, 1973, Ser. No. 403,726
Int. Cl.² H01L 35/30
U.S. Cl. 136—205 **1 Claim**



1. A thermoelectric system for use in relatively high temperature gradient applications, comprising:

a plurality of thermoelectric modules, said modules including a grouping of thermoelectric couples electrically interconnected to cool a first of the modules' two parallel planar surfaces and the dissipate heat from a second planar surface of said module, said first planar surface of each of said modules being adjacent said second planar surface of adjacent modules to provide a serial thermal relationship of said modules; and

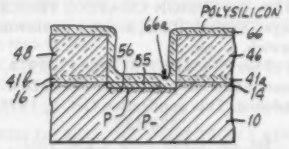
a separate heat pipe disposed between and thermally coupled to each adjacent pair of said thermoelectric modules, said heat pipe including a sealed tubular housing having a closed evaporator end and an opposite closed end, a volatile working fluid and capillary flow means being disposed within said housing for conveying said working fluid liquid toward said evaporator end thereof, said evaporator end being juxtaposed said second planar surface of said thermoelectric modules, and said thermoelectric modules being electrically interconnected by electrical conductors at least a portion of which are disposed within said sealed tubular housing.

4,011,105

FIELD INVERSION CONTROL FOR N-CHANNEL DEVICE INTEGRATED CIRCUITS

John O. Paivinen, Newtown Square, and Walter D. Eisenhower, Audubon, both of Pa., assignors to MOS Technology, Inc., Norristown, Pa.

Filed Sept. 15, 1975, Ser. No. 613,537
Int. Cl.² H01L 21/265
U.S. Cl. 148—1.5 **10 Claims**



1. A method of making an N-channel MOS integrated circuit structure comprising the steps of:

providing a substrate of a P^--type semiconductor material and forming a uniform thin oxide layer along a major surface of the substrate;

ion-implanting a P-type dopant through the oxide layer to form immediately thereunder a uniform layer of P^+-type semiconductor material extending along said major substrate surface;

removing selected spaced-apart portions of the oxide layer and the underlying P^+-type layer to leave a pattern of unimplanted active areas of the substrate spaced laterally

by unremoved fields of oxide and underlying fields of P^+-type material;

forming a uniform thin oxide layer over the active substrate areas and forming a substantially thicker oxide layer over said fields;

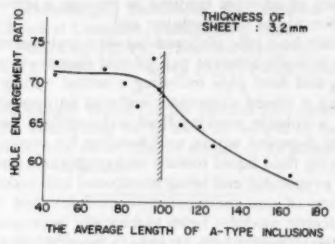
ion-implanting a P-type dopant through the thin oxide layer into the active substrate areas to form at said active areas layers of P-type semiconductor material whose resistivity is lower than that of the P^--type substrate and higher than that of the P^+-type fields; and

forming N-channel MOS devices at least at selected ones of said layers of P-type material.

4,011,106
HOT-ROLLED STEEL SHEET OF HIGH COLD FORMABILITY AND METHOD OF PRODUCING SUCH STEEL SHEET

Hiroshi Takechi, Kisarazu; Hiroaki Masui, Kimitsu; Chikara Fujii; Tsuyoshi Kawano, both of Kisarazu, and Kazuo Koyama, Kimitsu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed June 18, 1975, Ser. No. 588,021
Int. Cl.² C21D *7/13, 9/48*
U.S. Cl. 148—2 **4 Claims**



1. A method of producing a hot-rolled steel sheet having high cold formability which comprises producing a steel slab from sheet consisting essentially of 0.03–0.30%C and 0.15–2.0%Mn as the main additive ingredients by an ingot making or continuous casting method, said steel being free from sulifde shape-controlling agents, followed by hot-rolling said slab at a finishing temperature in the range of 800°–1000° C and at a finishing rolling speed of more than or equal to 1100 m/min. so as to make the average length of the sulfide and/or silicate inclusions of stringer form in the steel less than 100 μ.

4,011,107
BORON DIFFUSION COATING PROCESS

William J. Hayes, Shelby, Mich., assignor to Howmet Corporation, Greenwich, Conn.

Continuation of Ser. No. 479,775, June 17, 1974, abandoned, which is a continuation-in-part of Ser. No. 220,477, Jan. 24, 1972, abandoned. This application Oct. 8, 1975, Ser. No. 620,634
Int. Cl.² C23F *7/00;* **C23C** *9/02*
U.S. Cl. 148—6 **6 Claims**

1. A process for the diffusion coating of metals with boron, comprising the steps of packing a solid metal substrate in which the metal is free from titanium and is capable of forming a compound or solid sollution with boron, said metal being selected from the group consisting of iron alloys, nickel alloys, cobalt alloys, molybdenum, tungsten and alloys thereof having a melting point at a temperature above 1350° F, with a composition consisting essentially of a refractory oxide or refractory salt and boron in an amount within the range of 0.2 to 15% by weight based upon the metal of the oxide or salt and the boron, and heating the pack to a temperature above 1350° F under non-oxidizing conditions to diffusion coat the substrate.

4,011,108
CUTTING TOOLS AND A PROCESS FOR THE MANUFACTURE OF SUCH TOOLS

Per Ingvar Hellman, Soderfors, and Bo Gunnar Klang, Oxelosund, both of Sweden, assignors to Stora Kopparbergs Bergslags Aktiebolag, Falun, Sweden

Filed Jan. 19, 1976, Ser. No. 650,002
Int. Cl.² B22F *3/16, 5/00*
U.S. Cl. 148—11.5 P **4 Claims**

1. Cutting tool containing

Co	25 –	33	percent by weight
W	0 –	30	percent by weight
Mo	0 –	20	percent by weight
C	0 –	0.20	percent by weight
Si	0 –	1.0	percent by weight
Mn	0 –	0.4	percent by weight
Cr	0 –	0.4	percent by weight
Ni	0 –	0.4	percent by weight

and the balance Fe containing normal contaminants and where W + 2Mo being equal to 20 – 40% by weight, characterized by also containing 0.005 – 0.01% B or 0.005 – 0.03% by weight Zr or a mixture of both not exceeding 0.03% by weight, the structure of the tool consisting of a martensitic matrix having a grain size of 5 – 70 μ,m determined as austenite grain size, containing 5 – 15 percent by volume of an intracrystalline, very homogeneously distributed fine-disperse phase consisting of an intermetallic compound of Fe, Co, W and Mo and, between the grains of the base mass, 20 – 30 percent by volume of a primarily precipitated phase mainly consisting of the same intermetallic compound having a predominant grain size of 1 – 2 μ.m

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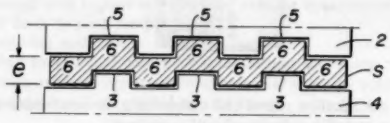
4,011,109
METHOD FOR PRODUCING STEEL FILAMENTS

David I. Golland, Cary, N.C.; Charles J. Runkle, Guntersville, Ala.; Milan F. Kozak, Raleigh, N.C., and John A. Schey, Waterloo, Canada, assignors to Monsanto Company, St. Louis, Mo.

Filed Nov. 10, 1975, Ser. No. 630,595
Int. Cl.² C21D *9/52*
U.S. Cl. 148—12 B **13 Claims**



1. A method for producing continuous lengths of high strength steel filaments, comprising the steps of:

a. providing a steel coil having a carbon content from about 0.30 to about 0.95, percent by weight,;

b. scoring the surface of said steel to form a plurality of grooves that delineate continuous longitudinal segments;

c. heat treating said steel to develop an appropriate metallurgical structure;

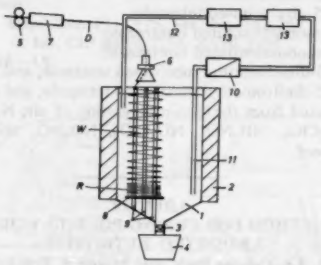
d. separating said segments into individual filaments by causing said steel to fracture at said grooves; and

e. passing said filaments through a mechanical straightener.

4,011,110
METHOD AND APPARATUS FOR FORMING AND TREATING BUNDLES OF STEEL RODS

Hermann-Josef Böckenhoff, Blecher; Walter Schaeffer, Cologne, and Berthold Kranz, Duren, all of Germany, assignors to Arbed-F & G Drahtwerke Koln GmbH, Cologne, Germany

Filed July 24, 1975, Ser. No. 598,667
Claims priority, application Germany, July 25, 1974, 2435830
Int. Cl.² C21D *1/64, 9/58*
U.S. Cl. 148—12 B **17 Claims**



1. In a manufacturing method wherein metallic rod issues hot from a mill, the improvement comprising the steps of: heating a salt bath above a lower predetermined temperature below that of said rod; withdrawing liquid from the bottom of said bath, cooling the withdrawn liquid to below a higher predetermined temperature below that of said rod and above said lower temperature, and reintroducing the cooled and withdrawn liquid into the top of said bath; forming said rod substantially directly as it issues from said mill and before substantial cooling of said rod into a succession of turns; lowering said turns as they are formed by gravity into said bath one after another through the bath while maintaining said turns out of contact with each other as they are lowered for a period of time sufficient to effect a predetermined structural change in the metal of said turns as a result of differences between the temperatures of said turns and of said bath; and accumulating said turns after lowering same into said bath into a bundle with said turns lying on one another.

4,011,111
HIGH STRENGTH, DEEP DRAWING QUALITY, LOW CARBON STEEL, ARTICLE FORMED THEREFROM, AND METHOD FOR PRODUCTION THEREOF

Rollin E. Hook, Dayton, Ohio, assignor to Armco Steel Corporation, Middletown, Ohio

Filed Aug. 25, 1975, Ser. No. 607,624
Int. Cl.² C21D *1/48*
U.S. Cl. 148—16.6 **11 Claims**

1. A method of increasing the yield strength of a low carbon steel sheet stock, which comprises:

providing a deoxidized, deep drawing quality steel containing, by weight percent, from about 0.002% to about 0.015% carbon, up to about 0.012% nitrogen, up to about 0.08% aluminum, about 0.05% to about 0.6% manganese, up to about 0.035% sulfur, up to about 0.01% oxygen, up to about 0.01% phosphorus, up to about 0.015% silicon, a nitride-forming element chosen from the group consisting of titanium, columbium, zirconium, and mixtures thereof, in amounts such that titanium in solution is from about 0.02% to about 0.2%, columbium in solution is from about 0.025% to about 0.3%, and zirconium in solution is from about 0.025% to about 0.3%, the sum total of said nitride-forming elements not exceeding about 0.3% in solution, and balance iron except for incidental impurities;

reducing said steel to a final thickness of about 0.02 to about 0.09 inch;

annealing said steel at about 705° to about 760° C in an atmosphere consisting essentially of about 6% to 20% by volume hydrogen and remainder essentially nitrogen for a period of time sufficient to produce complete recrystallization;

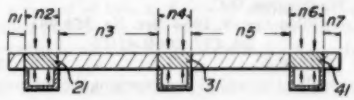
annealing the resulting sheet stock in an atmosphere consisting essentially of about 1% to about 20% by volume ammonia and remainder a carrier gas of nitrogen and hydrogen in which hydrogen is 6% to 20% by volume and remainder essentially nitrogen at a temperature between 593° and 705° C for a period of time of at least 3 hours and sufficient to cause reaction of said nitrideforming elements with the nitrogen of said ammonia to form small, uniformly dispersed nitrides and to cause formation of a surface layer of iron nitride; and

denitriding said sheet stock in an atmosphere consisting essentially of about 6% to about 50% by volume hydrogen and balance essentially nitrogen within the temperature range of 649° to 760° C for a period of time equal to or less than that of the nitriding annealing step whereby to remove the iron nitride surface layer.

4,011,112
MULTI-SECTIONED COOLING METHOD FOR HEATED STEEL MATERIAL

Koji Sakasegawa, Fukuyama; Kazuo Kunioka, Yokohama, and Atushi Ohsumi, Fukuyama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed May 28, 1974, Ser. No. 473,825
Claims priority, application Japan, June 8, 1973, 48-63921
Int. Cl.² C21D *1/18*
U.S. Cl. 148—134 **13 Claims**



1. A method for forcibly cooling an elongated heated steel material of predetermined length by cooling means, the heated steel material being maintained stationary relative to said cooling means at least in the longitudinal direction of said heated steel material, comprising:

multi-sectioning said elongated steel material in the longitudinal direction thereof into a plurality of zones;

cooling only a plurality of zones in said steel material which are spaced apart from each other by uncooled zones in the longitudinal direction of said steel material while maintaining said steel material stationary relative to said cooling means; and

thereafter cooling said steel material as a whole.

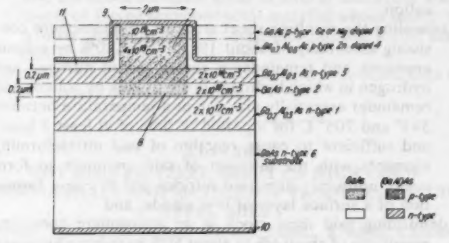
4,011,113
METHOD OF MAKING INJECTION LASERS BY EPITAXIAL DEPOSITION AND SELECTIVE ETCHING

George H. B. Thompson, and David F. Lovelace, both of Harlow, England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Jan. 2, 1976, Ser. No. 646,115
Claims priority, application United Kingdom, Jan. 9, 1975, 928/75
Int. Cl.² H01L *21/225, 21/205, 33/00*
U.S. Cl. 148—175 **4 Claims**

1. A method of making a double heterostructure injection laser including the steps of forming a double heterostructure with a layer bounded on both sides by layers of the same conductivity type but larger band gap, the upper of said larger bandgap layers having a thickness not large compared with the

wavelength of the laser radiation in said upper layer, of growing an epitaxial layer of opposite conductivity type on said upper layer using a conductivity type determining dopant of greater mobility and in greater concentration than used in the provision of the underlying layers of the double heterostructure, of selectively removing all of said epitaxial layer with the exception of a stripe extending in a direction normal to a cleavage plane, and of heating the structure so as to promote diffusion of the greater mobility dopant until the p-n junction beneath the stripe is translated into the smaller band gap layer of the double heterostructure.



4,011,114

CROSS-LINKED NITROCELLULOSE PROPELLANT FORMULATION

John C. Allabashi, Cumberland, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 9, 1964, Ser. No. 358,981
Int. Cl.² C06B *45/10*
U.S. Cl. 149—19.4 **8 Claims**

1. A propellant formulation comprising the following ingredients:

Nitrocellulose
Prepolymer of polyglycoladipate and 2,4-tolylene diisocyanate
Nitroglycerin
Cyclotetramethylenetetranitramine
Aluminum
2-Nitrodiphenylamine.

4,011,115

EXPLOSIVE COMPOSITIONS WITH THERMALLY CONDUCTIVE INGREDIENT

Roy Clifford Harris, Oxford, and John William Martin, Wilmington, both of England, assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 13, 1966, Ser. No. 557,869
Claims priority, application United Kingdom, June 11, 1965, 24878/65
Int. Cl.² C06B *43/00*, *41/02*
U.S. Cl. 149—22 **3 Claims**

1. In an explosive composition having an electrical conductive ingredient incorporated therein selected from the group consisting of graphite, lead styphnate and manganese dioxide; the improvement comprising the incorporation therein of a thermally conductive, electrically insulating substance selected from the group consisting of boron nitride, silicon nitride and beryllium oxide.

4,011,116

CARBON DIOXIDE LASER FUELS

Lester A. Lee, 405 River Wood Drive, Oxon Hill, Md. 20022, and Edward E. Baroody, 189 Bucknell Road, Bryans Rd., Md. 20616

Filed Dec. 6, 1974, Ser. No. 530,260
Int. Cl.² C06B *31/28*
U.S. Cl. 149—46 **13 Claims**

1. A composition capable of generating a laser beam when subjected to combustion in a gas dynamic-chemical transfer laser, said composition comprising a halogenated or deuterated compound selected from the group consisting of

a. a 5-substituted tetrazole;
b. a 1,5-disubstituted tetrazole;
c. a 2,5-disubstituted tetrazole;
d. a 1-monosubstituted bitetrazole;
e. a 2-monosubstituted bitetrazole;
f. a 1,5-dinitromethyl substituted tetrazole; and
g. a 2,5-dinitromethyl substituted tetrazole, and an oxidizer selected from the group consisting of air, N_2O, $KClO_4$, NH_4ClO_4, NH_4NO_3, ND_4ClO_4, ND_4NO_3 and mixtures thereof.

4,011,117

METHOD FOR CURING POLY(GLYCIDYL 2,2-DINITRO-2-ETHOXIDE)

George A. Lo, Canoga Park, and Milton B. Frankel, Tarzana, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 23, 1974, Ser. No. 472,795
Int. Cl.² C06B *25/00*
U.S. Cl. 149—88 **1 Claim**

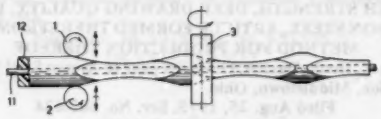
1. A method for curing a poly(glycidyl 2,2-dinitro-2-fluoroethoxide) prepolymer which comprises the step of adding tris (β-isocyanoethyl) nitromethane to said prepolymer in an amount sufficient to effect the cure thereof.

4,011,118

METHOD OF MANUFACTURING A COAXIAL CABLE, AND COAXIAL CABLE MADE BY THIS METHOD

Louis Joseph Henri Geominy, Venlo, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 21, 1975, Ser. No. 579,321
Claims priority, application Netherlands, May 21, 1974, 74-06784
Int. Cl.² H01B *13/06*
U.S. Cl. 156—51 **7 Claims**



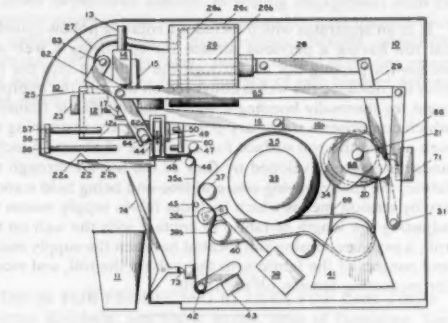
1. A method of continuously manufacturing a coaxial cable having a dielectric which consists partly of a gas, comprising a central conducting wire, dielectric spacers surrounding said wire, and an envelope comprising a cylindrical outer conductor and an outer sheath, comprising the steps of continuously extruding a cylinder of synthetic dielectric material having a first diameter concentrically about a wire made of a conductive material, then cooling the synthetic material, then mechanically removing parts of the cylinder at longitudinally evenly distributed intervals along the cylinder by members which reciprocate with respect to the longitudinal direction of the cylinder of dielectric material such that said central conducting wire remains enveloped by directly adjacent dielectric material, while continuously advancing said cylinder in its longitudinal direction, the parts so removed being separated by circular cylindrical portions extending to said first diame-

ter, and then applying a cylindrical sheathing about said dielectric so as to enclose gasfilled spaces, extending longitudinally along the cable without communication with one another, interiorly of said sheathing where the parts were removed.

4,011,119
METHOD FOR COLD LIDDING CONTAINERS WITH ELASTOMERIC FILM

Richard Patrick Mitchell, and Thomas Mathew Gorshe, both of Neenah, Wis., assignors to American Can Company, Greenwich, Conn.

Filed Dec. 19, 1975, Ser. No. 642,367
Int. Cl.² B65B *7/16*; B67B *3/04*
U.S. Cl. 156—69 **3 Claims**



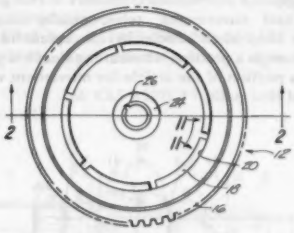
1. A method for cold lidding an open-top container with roll-stock elastomeric film, comprising the steps of:
   a. presenting a web of the elastomeric roll-stock, film below the open-ended bottom of a lidding chamber,
   b. severing said web from said roll-stock,
   c. holding said web in air-tight relationship across the open-ended bottom of the lidding chamber,
   d. evacuating said lidding chamber above said web while maintaining said air-tight relationship to stretch said web, within its elastic limit, upwardly into said lidding chamber,
   e. inserting the top of the container to be lidded into said lidding chamber so that said stretched web extends below the top of said container and about the periphery thereof, and
   f. releasing said stretched web over the top of said container, allowing the web to contract onto a periphery of said container, thereby applying a lid to said container.

4,011,120
METHOD FOR FASTENING CERAMIC MAGNETS TO A FLYWHEEL USING CENTRIFUGAL FORCE

Glenroy Newcomb Aggen, New Holstein, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed May 2, 1975, Ser. No. 573,929
Int. Cl.² B32B *31/16*; H02K *15/02*
U.S. Cl. 156—74 **24 Claims**

1. The method of attaching a magnet on a radially inner surface of a rotor for use in a dynamoelectric system and the like wherein magnet is to be located at a predetermined angular position on said rotor, the steps of applying an adhesive to either said magnet or said rotor at a proposed interface therebetween, positioning said magnet within said rotor, spinning said rotor and said magnet about a rotational axis of said rotor while aligning said magnet at said predetermined angular position on said rotor as said magnet is pressed against said rotor by centrifugal force and continuing to spin said rotor and



said magnet to maintain said magnet pressed against said rotor while said adhesive sets.

4,011,121
ADHESIVE BONDING OF POLY(ARYLENE SULFIDE) SURFACES

Richard C. Doss, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 30, 1975, Ser. No. 573,182
Int. Cl.² B32B *31/12*; B29C *17/12*; B32B *7/12*, *31/26*
U.S. Cl. 156—82 **11 Claims**

1. A method to bond a first solid surface to a second solid metal surface comprising
   a. coating said first solid surface with a material selected from the group consisting of unfilled poly(arylene sulfide) and fiberglass-filled poly(arylene sulfide) to produce a first poly(arylene sulfide) surface,
   b. submitting said first poly(arylene sulfide) surface to a pre-treatment selected from the group consisting of flame-treating the unfilled poly(arylene sulfide) surface for a period of time sufficient to dull the luster of the unfilled poly(arylene sulfide) surface but insufficient to substantially alter said surface by melting, pyrolyzing or burning thereof, mechanically roughening the unfilled poly(arylene sulfide) surface, and mechanically roughening the fiberglass-filled poly(arylene sulfide) surface,
   c. adhesive-bonding said first poly(arylene sulfide) surface to said second solid metal surface.

6. A method to bond a first solid surface to a second solid surface wherein
   a. a first solid surface consisting of unfilled poly(arylene sulfide) is flame-treated for a period of time sufficient to dull the luster of the unfilled poly(arylene sulfide) surface but insufficient to substantially alter said surface by melting, pyrolyzing or burning thereof, and
   b. said flame-treated first solid surface of unfilled poly(arylene sulfide) is adhesively bonded to said second solid surface.

4,011,122
METHOD FOR PRODUCING PLASTIC-COVERED CONTAINERS

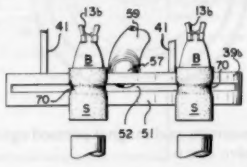
Richard I. Ashcroft, Alameda, Calif., assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 464,224, April 25, 1974, Pat. No. 3,959,065. This application Sept. 29, 1975, Ser. No. 617,884
Int. Cl.² B29C *27/00*
U.S. Cl. 156—86 **8 Claims**

1. The method of forming an encircling plastic covering on elongated base articles comprising:
   conveying base articles in a first path with their longitudinal axes perpendicular to the direction of movement,
   moving hollow body sleeves of a heat shrinkable plastic material in a separate, second path spaced from the articles, a portion of said second path being parallel with said first path so that the central longitudinal axes of said

sleeves are substantially in a coaxial relationship with said articles, the sleeves having an interior cross dimension slightly larger than the exterior cross dimension of said articles,

during said movements, telescopically transferring the sleeve over each article by movement in said coaxial direction to a position whereat the sleeve is placed over at least a portion of the article for movement with the latter in said first path,



conveying the transferred sleeve and article together in said first path through a subsequent portion thereof past a zonal heating device for applying tacking heat to an annular exterior band region of the sleeve adjacent said article, thereby shrinking said annular band of the sleeve onto the article holding the sleeve in place on the article,

conveying the sleeve and article further in said first path into and through a heat applying device, and

applying heat to said sleeve sufficient to completely shrink it into a snug, conforming, encircling relationship on the surface of said article.

4,011,123
APPARATUS FOR ETCHING A CONTINUOUSLY MOVING THIN METAL STRIP

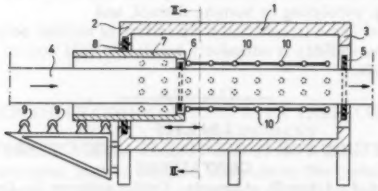
Petrus Johannes Buysman, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,105

Claims priority, application Netherlands, Jan. 9, 1975, 7500246

Int. Cl.² C23F *1/02*

U.S. Cl. 156—345 **3 Claims**



1. An apparatus for etching a continuously moving thin metal strip, comprising an etching compartment in which spraying heads for etching liquid are arranged along the length of the etching compartment, said compartment being closed on the inlet end and on the outlet end by means of closure means pressing against both main surfaces of the strip, said closure means on at least one of the two ends being arranged in a housing which is movable in the etching compartment along the path of movement of the metal strip, and the housing being sealed on the outside relative to the etching compartment.

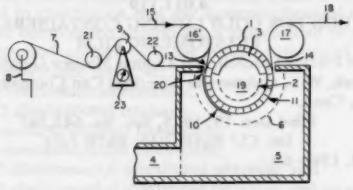
4,011,124
APPARATUS FOR CONTINUOUS HOT AIR BONDING A NONWOVEN WEB

James Fletcher Baxter, Hendersonville, Tenn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed July 9, 1975, Ser. No. 594,283

Int. Cl.² F26B *11/18*; D04H *3/12*

U.S. Cl. 156—358 **1 Claim**



1. In an apparatus which includes a rotating hollow cylindrical roll having a pervious surface for conveying a web and means for passing hot air through the web and into the roll over the distance the web is conveyed on the roll; the improvement for thermally bonding a web of thermoplastic filaments which comprises a stationary porous fabric for restraining the web against the roll surface for a distance of about **35** inches under pressure developed by flow of the hot air through the fabric, the fabric having one end free and being held stationary by tension means which includes fabric supply means for adjusting the length of fabric in contact with the web on the roll, a pressure sensing roll located between the supply means and contact of the fabric with the web on the roll, and means for measuring tension on the fabric.

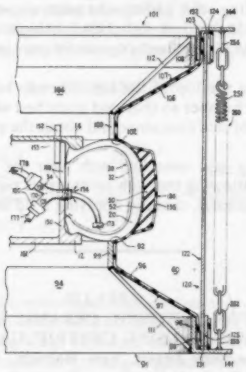
4,011,125
TIRE RETREADING

Guy Pelletier, Melbourne, Canada, assignor to Bombardier Limitee, Canada

Filed May 31, 1974, Ser. No. 475,309

Int. Cl.² B29H *5/04*

U.S. Cl. 156—394 **6 Claims**



1. Apparatus for retreading a worn pneumatic tire with a fully pre-cured tread band to be bonded to the tread surface of said tire by means of a layer of cushion gum, said apparatus comprising a rim assembly for mounting centrally of said tire and having first and second flange means for preventing outward displacement of the beads of said tire, an inner tube assembly disposed within said tire and including a steam impervious rubber tube and a first steam supply and drain assembly attached to said rubber tube and projecting inside said rubber tube, a cage assembly for receiving therein the tire

assembly, which consists of said rim assembly with said inner tube assembly and said tire in position thereon, and for defining an annular steam chamber circumscribing said tire assembly, a second steam supply and drain assembly in communication with the inside of said annular steam chamber, a housing for said cage assembly, and first and second steam control means respectively for said first and second steam supply and drain assemblies, characterized in that said cage assembly consists of a first and second cone member, means for retaining said cone members on either sides of said tire for centering said cone members and said rim assembly on a common axis and for preventing outward displacement of one cone member relative to the other cone member throughout the cushion gum curing process, each cone member having an inner peripheral edge of a predetermined common diameter for contacting the corresponding side wall region of said tire radially outwardly of said rim assembly flange means but radially inwardly of said tread band, a main ring assembly for circumscribing the outer peripheral edges of said cone members, and a steam impervious bladder in sealing engagement with the opposite edges of said main ring assembly, said bladder being an endless belt made of heat-resistant, flexible rubber-like material, the inwardly facing surface of said main ring assembly and the outwardly facing surface of said bladder defining said steam chamber.

4,011,126

DRUM FOR PRODUCING BLANKS FOR CAR TIRES

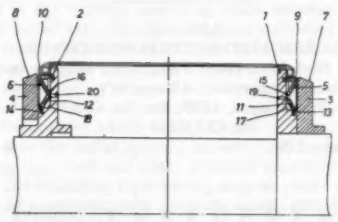
Werner Eichholz, and Gerd Krebs, both of Hamburg, Germany, assignors to Phoenix Gummiwerke A.G., Hamburg, Germany

Filed Feb. 28, 1975, Ser. No. 553,880

Claims priority, application Germany, Mar. 1, 1974, 2409737

Int. Cl.² B29H *17/26*

U.S. Cl. 156—416 **1 Claim**



1. A device for producing blanks for car tires of rubber with braker strips, said device comprising a drum consisting of coaxial rings movable axially relative to each other, said rings having outer spaced flanges forming an annular groove in each ring, and a ring insert located in each groove and consisting of an elastomeric material, said ring insert comprising a top cylindrical supporting part and a bottom disc part connected by an integral joint with said supporting part at the axial outer edge of each supporting part and extending radially inward into said groove, said disc part having a joint therein forming a toggle-like bend in cross-section, said supporting parts being fixed to the axially outer face of the axially inner flange of each ring, said disc part extending to the bottom of said groove, means for applying fluid pressure into said groove to cause the radial expansion of said supporting parts at locations not fastened to said flanges by the air pressure causing the strengthening of the toggle-like bends in said disc parts.

4,011,127

TIRE BUILDING DRUM

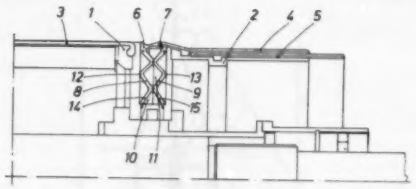
Werner Eichholz, and Gerd Krebs, both of Hamburg, Germany, assignors to Phoenix Gummiwerke Aktiengesellschaft, Hamburg, Germany

Filed Apr. 8, 1975, Ser. No. 566,102

Claims priority, application Germany, Apr. 17, 1974, 2418410

Int. Cl.² B29H *17/22*

U.S. Cl. 156—416 **5 Claims**



1. A tire building drum for assembling and shaping tire carcasses toroidal, comprising a central durm, and two side drums, an inflatable membrane carried by said central drum, inflatable membranes carried by said side drums, means forming radial grooves located between the central drum and each side drum, a core supporting ring and membrane supporting ring both of elastomeric material having a shore hardness A of about 90°, said membrane supporting ring located axially outwardly of, adjacent to, and in overlapping contact with the core supporting ring to form a composite cylindrical ring structure axially spanning said groove, and flanges located in said groove, one of said flanges being connected to the axially inward end of each core supporting ring and extending to the bottom of said groove at the axially inward edge and one of said flanges being connected to the axially outward end of each membrane supporting ring and extending to the bottom of said groove at its axially outward edge, said flanges consisting of annular discs with bent interconnected movable portions with the bends of the core and membranes supporting rings flanges being in mirror image so that when radially collapsed alternate bends in each pair of core and membrane supporting rings flanges contact each other and contact the side walls of the groove and when radially expanded the bends are substantially removed from the flanges and they are pressed out of contact with each other and against the side walls of said grooves, and means to introduce air pressure between said flanges to radially expand the flanges and thus the core and membrane support rings attached thereto and supported by said flanges.

4,011,128

APPARATUS FOR FORMING A CROSS-ORIENTED FILM

Shigemasa Suzuki, Toda, Japan, assignor to Nippon Ekika Seikei Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 553,274, Feb. 26, 1975, which is a continuation of Ser. No. 287,855, Sept. 11, 1972, abandoned. This application July 17, 1975, Ser. No. 596,670

Claims priority, application Japan, Sept. 9, 1971, 46-69233

Int. Cl.² B29D *23/04*

U.S. Cl. 156—500 **2 Claims**

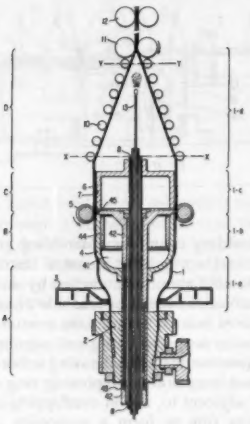
1. An apparatus for forming a seamless cross-oriented film comprising:

tubular-film-producing means for forming a thermoplastic synthetic resin tubular film;

means for maintaining the temperature of said tubular film below the melting point yet above the secondary transition temperature thereof, disposed downstream of said producing means;

twist-preventing means, in contact with said film for pressing and feeding said tubular film in the film-forming

direction, disposed at an axial position of said apparatus substantially coincident with said temperature maintaining means and which includes a fixed mandrel adapted to be disposed within said tubular film and in contact therewith and at least three feed rolls provided, within at least one plane disposed at an axial position corresponding to that of said fixed mandrel, externally of said tubular film and in contact therewith so that said tubular film may not undergo slip with respect to any cross-orientation force created by means of drawing and lateral rotation operations;



cross-orientation means, disposed immediately downstream of said twist-preventing means, for continuously rotating said tubular film, relative to the film-forming direction or laterally thereof while said film is moving in said film-forming direction, at a peripheral speed of at least twice as fast as the feed speed of said twist-preventing means; and

a take-up device, disposed downstream of said cross-orientation means, for imparting a drawing speed, of at least twice as fast as the feeding speed of said twist-preventing means, to said cross-orientation means so as to thereby successively flatten said tubular film into two layers, said take-up device including guide rolls and nip rolls.

4,011,129

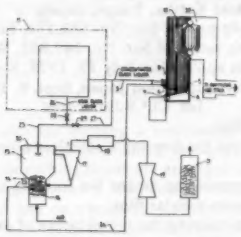
PULP MILL RECOVERY SYSTEM

George Herbert Tomlinson, II, Ile Perrot, Canada, assignor to Domtar Limited, Montreal, Canada

Filed Apr. 11, 1975, Ser. No. 567,473

Int. Cl.² D21C *11/04, 11/12*

U.S. Cl. 162—30 K **4 Claims**



1. A method of increasing recovery capacity of a kraft pulp mill without substantially increasing the emissions from a smelting kraft recovery furnace having a boiler section, comprising, cooking cellulosic material thereby to produce a kraft pulp, separating spent black liquor from said pulp, concentrating said black liquor, injecting a portion of said concentrated black liquor to an oxidation zone in said kraft recovery furnace whereby a char is formed and collected as a char bed on a hearth at the bottom of said kraft recovery furnace, maintaining a reducing atmosphere in said char bed, thereby to transform sodium sulfate contained in said spent black liquor to sodium sulfide, injecting a further portion of said spent black liquor to an oxidation zone external of said Kraft recovery furnace thereby to form pellets containing sodium carbonate and sodium sulfate from said further portion of said black liquor, injecting said pellets free from entraining liquid into said kraft recovery furnace and onto said char bed, said pellets being substantially spherical and sufficiently large so that there is no significant entrainment of the pellets by the furnace gases and yet small enough so that operation of the furnace is not disrupted to render the process inoperative, and maintaining a temperature and reducing conditions in said bed thereby to convert sodium sulfate in said pellets to sodium sulfide, and withdrawing a smelt of sodium sulfide and sodium carbonate from said kraft furnace.

4,011,130

LEATHER-LIKE WATERLAID SHEETS CONTAINING PARTICULATE FILLERS

Robert A. Worden, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sept. 9, 1974, Ser. No. 504,237

Int. Cl.² D21H *3/48, 5/12*

U.S. Cl. 162—151 **26 Claims**

1. A leather-like, waterlaid sheet comprising a major amount of essential solids consisting of elastomeric binder and nonelastomeric solids comprising particulate filler and reinforcing fiber, said particulate filler comprising about 10 to 60% by weight of said essential solids, the particles of said particulate filler being inflexible, non-fibrous, rounded particles having an average particle size in the range of about 1 to 160 microns, the length of any major axis of the particles being no more than twice the length of any of the other axes, said reinforcing fiber comprising at least 5% by weight of said essential solids and said elastomeric binder being present in an amount sufficient to provide an integral, cohesive sheet.

4,011,131

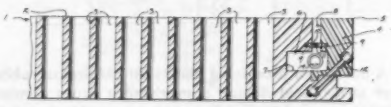
LUBRICATED SUCTION BOX COVER

Charles B. Nicholson, Glens Falls, N.Y., assignor to Albany International Corporation, Albany, N.Y.

Filed Aug. 6, 1975, Ser. No. 602,357

Int. Cl.² D21F *1/52*

U.S. Cl. 162—279 **8 Claims**



1. A fabric lubricating structure for a suction box comprising:

a cover having a leading portion with a fabric supporting surface, and including a channel in the interior thereof;

means for introducing a fabric lubricating liquid into said channel;

said channel having a lower manifold region for receiving fabric lubricating liquid, and a throat region extending upward from the manifold region which opens upon said fabric supporting surface; and

a metering member mounted in said channel and located intermediate said manifold region and the opening of said throat region, which metering member has a series of

orifices to control the flow of lubricating liquid from said manifold region to said throat region to maintain the surface of the lubricating liquid in said throat region flush with said fabric supporting surface.

4,011,132

NUCLEAR REACTOR PRESSURE VESSEL FOR NUCLEAR REACTORS WITH PLASTICALLY DEFORMABLE SPACERS

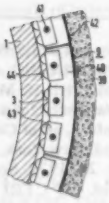
Hermann Kumpf, Wendelstein, and Gottfried Molz, Erlangen, both of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Jan. 22, 1975, Ser. No. 543,136

Claims priority, application Germany, Jan. 29, 1974, 2404171

Int. Cl.² G21C 9/00

U.S. Cl. 176—38 **6 Claims**



1. Cylindrical pressure vessel structure for nuclear reactors comprising a steel pressure vessel adapted to receive therein a pressurizing medium, said steel pressure vessel, during operating condition thereof wherein said steel pressure vessel is heated and pressurized, being expansible, an outer concrete enclosure, said steel pressure vessel being mounted within said outer concrete enclosure in unheated and unpressurized condition and being radially and axially spaced from said outer concrete enclosure, and a supporting and insulating layer secured in the radially extending space between said steel pressure vessel and said outer concrete enclosure in radially spaced-apart relationship to both said steel pressure vessel and said outer concrete enclosure, a layer of concrete interposed in the radial spacing between said supporting and insulating layer and said outer concrete layer, said layer of concrete being produced in situ by solidification of a matrix thereof poured into the radial spacing between said supporting and insulating layer and said outer concrete enclosure, said supporting and insulating layer having support plates on the side thereof adjacent said steel pressure vessel, spacer members connected with said support plates and having projections extending beyond the surface of said support plates in direction toward said steel pressure vessel, said spacer members defining a given radial spacing of said support plates from said pressure vessel, said spacer members being unyieldable against radial forces produced during solidifcation of said layer of concrete interposed in the radial space between said supporting and insulating layer and said outer concrete enclosure, so as to maintain said given radial spacing of said support plates from said pressure vessel, said spacer members being yieldable, however, to radial forces applicable thereto by said expansion of said pressure vessel during said heated and pressurized condition thereof, so that said projections of said spacer members plastically deformed to permit the expanding pressure vessel to expand into the radial spacing between said pressure vessel and said supporting and insulating layer and bear against said outer concrete enclosure through the intermediary of said deformed spacer members, said supporting and insulating layer and said layer of concrete.

4,011,133

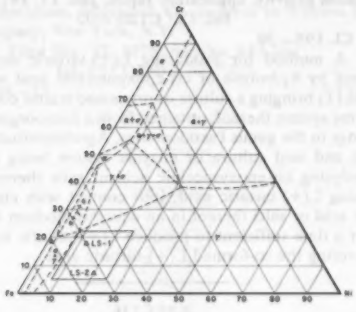
AUSTENITIC STAINLESS STEEL ALLOYS HAVING IMPROVED RESISTANCE TO FAST NEUTRON-INDUCED SWELLING

Everett E. Bloom; James O. Stiegler; Arthur F. Rowcliffe, all of Oak Ridge, and James M. Leitnaker, Kingston, all of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 16, 1975, Ser. No. 596,546

Int. Cl.² G21C 3/02

U.S. Cl. 176—68 **5 Claims**



1. A nuclear fuel element comprising a core selected from the group consisting of an oxide nitride or carbide of uranium and an austenitic stainless steel alloy cladding consisting essentially of Fe, Cr, and Ni as prescribed within the area ABCD in the ternary diagram of FIG. **3**, and a void depressing concentration of Si and Ti.

4,011,134

PRESSURIZED-COOLANT REACTOR FUEL ROD

Heinz Stehle, Marloffstein, and Hans-Jürgan Romeiser, Grossgrundlach, both of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Nov. 7, 1974, Ser. No. 521,849

Claims priority, application Germany, Nov. 9, 1973, 2356182

Int. Cl.² G21C 3/02

U.S. Cl. 176—68 **3 Claims**

1. A pressurized-coolant reactor fuel rod comprising a cladding tube having ends closed gas-tightly, said tube internally defining a fuel-containing space, nuclear fuel in said space, said tube containing a fission gas plenum chamber formed by a capsule having a flow choke connecting the chamber with said space and said fuel, said capsule being positioned between said fuel and one of said ends closed gas-tightly, and said capsule being elastically expandable

lengthwise with respect to said tube and engaging and restraining said fuel against displacement lengthwise with respect to said tube, by pressing said fuel elastically away from said one of said tube's closed ends.

4,011,135

PRODUCTION OF L(+)-TARTARIC ACID

Yoshio Kamatani, Osaka; Hisayoshi Okazaki, Kyoto; Ko Imai, Osaka; Noriaki Fujita, Suita; Yoshio Yamazaki, Toyonaka, and Katsuhiko Ogino, Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Japan

Filed Jan. 19, 1976, Ser. No. 650,025

Claims priority, application Japan, Jan. 17, 1975, 50-8149

Int. Cl.² C12D *1/02*

U.S. Cl. 195—30 **13 Claims**

1. A method for producing L(+)-tartaric acid or salts thereof by hydrolysis of cis-epoxysuccinic acid which comprises (1) bringing a culture or processed matter containing an enzyme system thereof, obtained from a microorganism which belongs to the genus Pseudomonas, Agrobacterium or Rhizobium and said culture or enzyme system being capable of hydrolyzing cis-epoxysuccinic acid or salts thereof, thereby forming L(+)-tartaric acid, into contact with cis-epoxysuccinic acid or salts thereof in an aqueous medium at 5° to 50° C for a time sufficient to produce L(+)-tartaric acid and (2) recovering the so-formed L(+)-tartaric acid.

4,011,136

BIOCHEMICAL PROCESS

Eunice Jean Napier, Mattingley, England, assignor to Glaxo Laboratories Limited, Greenford, England

Filed July 22, 1974, Ser. No. 490,844

Claims priority, application United Kingdom, July 23, 1973, 35057/73

Int. Cl.² C07G *7/02*, *7/028*

U.S. Cl. 195—31 R **13 Claims**

1. A process for the production of maltose, wherein starch in an aqueous medium is treated with a β-amylase derived from a strain NCIB 11,033 of Bacillus circulans having the following characteristics:

a. at 37° C the pH for its optimal activity on glycogen substrate is 6.5 to 7.5.

b. the enzyme is stable at 60° C for at least 30 minutes without substrate (pH 6.0, 0.05M tris/maleate buffer);

c. the enzyme is not significantly inhibited by the sulphydryl-inhibitor, sodium p-chloromercuriphenylsulphonate at levels up to 2 mM;

d. gel filtration on a porous polyacrylamide gel possessing a MW exclusion limit of 100,000, shows a single peak of β-amylase activity corresponding to a molecular weight of 53,000 to 63,000;

e. the isoelectric point determined by thin layer gel electrofocusing is pH 4.6;

f. neither activity nor thermostability is affected by calcium chloride in the range 0.001 to 0.1 M.

4,011,137

PROCESS FOR PRODUCING DEXTROSE USING MIXED IMMOBILIZED ENZYMES

Kenneth N. Thompson; Richard A. Johnson, and Norman E. Lloyd, all of Clinton, Iowa, assignors to Standard Brands Incorporated, New York, N.Y.

Filed Aug. 26, 1974, Ser. No. 500,975

Int. Cl.² C12D *13/02*

U.S. Cl. 195—31 R **17 Claims**

1. A process for converting starch to dextrose comprising treating starch with alpha-amylase to obtain a partially hydrolyzed starch solution containing at least 10 percent hydrolyzed starch and then treating the partially hydrolyzed starch solution with an enzyme system comprising immobilized glucoamylase selected from the group consisting of glucoamylase covalently bonded to an insoluble carrier and glucoamylase adsorbed on an insoluble carrier and immobilized alpha-amylase selected from the group consisting of alpha-amylase covalently bonded to an insoluble carrier and alpha-amylase adsorbed on an insoluble carrier under conditions whereby a hydrolysate containing at least about 92 percent dextrose on an ash free, dry basis is produced.

4,011,138

PROCESS FOR THE PREPARATION OF CHOLESTEROL ESTERASE

Osamu Terada, and Takayuki Uwajima, both of Machida, Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Filed June 17, 1975, Ser. No. 587,699

Claims priority, application Japan, June 17, 1974, 49-68160

Int. Cl.² C12D *13/10*

U.S. Cl. 195—65 **13 Claims**

1. A process for preparing cholesterol esterase which comprises culturing a microorganism belonging to the species *Pseudomonas fluorescens* and capable of producing cholesterol esterase in a nutrient medium, producing and accumulating cholesterol esterase extracellularly and intracellularly, and recovering said cholesterol esterase.

4,011,139

PROCESS FOR PRODUCING α-1,6 GLUCOSIDASES USING THERMOPHILIC MICROORGANISMS

R. Otto Horwath, Westport; John A. Lally, and Philip Rotheim, both of Stamford, all of Conn., assignors to Standard Brands Incorporated, New York, N.Y.

Filed Nov. 26, 1974, Ser. No. 527,405

Int. Cl.² C12D *13/10*

U.S. Cl. 195—65 **15 Claims**

1. A process for producing α-1,6 glucosidases comprising growing thermophilic microorganisms selected from the group consisting of the Bacillus genus, the Antinomycetales order and gram negative rod shaped microorganisms which produce α-1,6 glucosidases under aerobic conditions in an aqueous nutrient medium having present a carbohydrate selected from the group consisting of glucose, isomers of glucose, oligomers and polymers containing a glucose moiety or isomers of a glucose moiety and mixtures thereof and maintaining the medium at a suitable pH and a temperature of from about 45° to about 70° C to provide substantial growth of the microorganisms and production of α-1,6 glucosidase enzymes.

4,011,140

PROCESS FOR PRODUCING ANTITUMOR COMPOUND

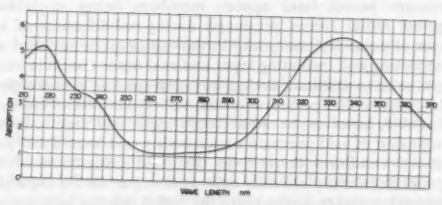
Nobuhiko Komatsu, Tokyo, Japan, assignor to The Green Cross Corporation, Osaka, Japan

Filed Apr. 2, 1976, Ser. No. 673,056

Claims priority, application Japan, Dec. 25, 1975, 50-155500

Int. Cl.² C12D *9/00*

U.S. Cl. 195—80 R **16 Claims**



1. A process for producing 5,10,11,11a-tetrahydro-9,11-dihydroxy-8-methyl-5-oxo-lH-pyrrolo-[2,1-c][1,4]benzodiazepin-2-acrylamide (PBA), which comprises aerobically culturing Streptomyces spadicogriseus KOMATSU, FERM

p-3275, ATCC 31179, to produce said compound in the medium, and recovering said compound from the medium.

4,011,141
PROCESS FOR MAXIMIZING THE GROWTH AND NICOTINE DEGRADING ACTIVITY OF MICROORGANISMS

Lawrence E. Gravely, Louisville, Ky.; Vernon L. Geiss, Floyd Knobs, Ind., and Richard P. Newton, Louisville, Ky., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Nov. 17, 1975, Ser. No. 632,857
Int. Cl.² C12B 1/20
U.S. Cl. 195—96 **13 Claims**

1. The process of maximizing the growth and nicotine degrading activity of microorganisms effective to degrade nicotine through a biochemical mechanism in which 3-succinoylpyridine is formed, which microorganisms are selected from the group consisting of *Cellulomonas sp.* and *Pseudomonas putida*, comprising:

inoculating nicotine containing broth with said microorganisms, and

subjecting said broth to aeration and agitation, said broth:

a. being maintained at a pH of between about 6 and about 7.8;

b. having an initial nicotine concentration of at least 0.5 mg. per ml. up to an amount which is toxic to said microorganisms; and

c. being maintained at a temperature between about 10° C and about 45° C.

4,011,142
PROCESS FOR MEASURING THE PLASMINOGEN CONTENT OF A SAMPLE

Eckart Jacobi, Erkrath, Germany, assignor to Behring-Werke AG. Marburg, Germany

Filed Jan. 15, 1975, Ser. No. 541,335
Claims priority, application Germany, Jan. 27, 1973, 2338254; June 29, 1974, 2431342
Int. Cl.² G01N 31/14
U.S. Cl. 195—103.5 R **8 Claims**

1. The process of measuring the plasminogen content of a plasma sample comprising the steps of:

a. eliminating any antiplasmin from the plasma sample,

b. adding a predetermined amount of fibrinogen to the sample,

c. adding an amount of plasminogen activator sufficient to activate all possible plasminogen present in the sample, and

d. incubating the sample a sufficient period of time to form a solution of fibrinogen and antiplasmin-free, plasminogen-activated plasma,

e. adding thrombin to the solution, and

f. timing the reaction until the moment of fibrin coagulation is observed in the solution, the plasminogen content to be established by comparing the observed time to fibrin coagulation with an established normal standard.

4,011,143
MATERIAL DEPOSITION MASKING FOR MICROCIRCUIT STRUCTURES

Louis A. Del Monte, Minnetonka, and Robert H. Grangroth, Buffalo, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Division of Ser. No. 373,526, June 25, 1973, Pat. No. 3,897,324. This application July 28, 1975, Ser. No. 599,796
Int. Cl.² C25D 5/02, 7/12
U.S. Cl. 204—15 **13 Claims**

1. A method for providing deposition materials on a microcircuit structure through a separate mask provided as a sheet of a mask material having deposition openings therein, said method comprising:

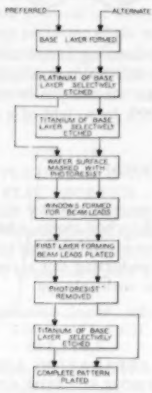
flexing said mask toward a substantially protrudent shape while forcing a major surface thereof, which tends toward being substantially convex as a result of said flexing, against a first surface of said structure sufficiently to provide sealing around said deposition openings, and

depositing said deposition materials.

4,011,144
METHODS OF FORMING METALLIZATION PATTERNS ON BEAM LEAD SEMICONDUCTOR DEVICES

Albert K. Bachman, Allentown, Pa., assignor to Western Electric Company, New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,201
Int. Cl.² C25D 5/02, 7/12
U.S. Cl. 204—15 **9 Claims**


PREFERRED
ALTERNATE
BASE LAYER FORMED
PLATINUM OF BASE LAYER SELECTIVELY ETCHED
TITANIUM OF BASE LAYER SELECTIVELY ETCHED
WAFER SURFACE MASKED WITH PHOTORESIST
WINDOWS FORMED FOR BEAM LEADS
FIRST LAYER FORMING BEAM LEADS PLATED
PHOTORESIST REMOVED
TITANIUM OF BASE LAYER SELECTIVELY ETCHED
COMPLETE PATTERN PLATED

1. A method of forming conducting paths including supporting elements on a surface of a semiconductor wafer, which comprises:

depositing a conductive film on the surface of the wafer;

defining a pattern of the paths including the supporting elements on the film;

selectively electroplating a first layer of metal on portions of the pattern to form the supporting elements;

removing the film except for the portions of the defined pattern;

coupling the pattern into an electrical metal deposition circuit;

and

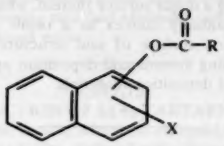
electroplating a second layer of metal over the elements and over portions of the pattern not covered by the elements.

4,011,145
ELECTROCHEMICAL MANUFACTURE OF AROMATIC ESTERS

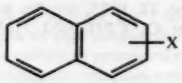
Juergen Haufe, Ludwigshafen; Costin Rentzea, Heidelberg, and Dieter Degner, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed June 18, 1975, Ser. No. 587,919
Claims priority, application Germany, July 19, 1974, 2434845
Int. Cl.² C25B 3/00
U.S. Cl. 204—59 R **4 Claims**

1. Electrochemical manufacture of aromatic or heterocyclic esters of the formula



in which X denotes hydrogen, chlorine or methyl and R denotes hydrogen, methyl or ethyl by anodic acyloxylation of compounds of the formula



in which X has the meaning stated above, with an alkanoic acid of the formula RCOOH, in which R has the meanings stated above, wherein electrolysis is carried out in the presence of from 1 to 20% by weight of a conducting salt of the formula

$$[R^1R^2R^3NH]^+ [OOCR]^-$$

in which R has the meanings stated above and R^1, R^2 and R^3 denote alkyl of 1 to 8 carbon atoms, whereby when X is hydrogen, the acyloxylation of naphthalene occurs in the α-position, and whereby said conducting salt is recovered by distillation following the anodic acyloxylation.

4,011,146

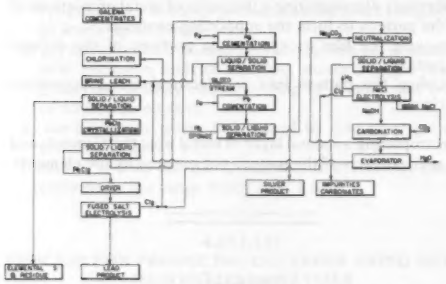
PROCESS FOR SEPARATION AND RECOVERY OF METAL VALUES FROM SULFIDE ORE CONCENTRATES

Enzo L. Coltrinari, Arvada, and James E. Reynolds, Golden, both of Colo., assignors to Cyprus Metallurgical Processes Corporation, Los Angeles, Calif.

Continuation-in-part of Ser. No. 516,450, Oct. 21, 1974, abandoned. This application Nov. 13, 1975, Ser. No. 631,700

Int. Cl.² C01G *5/00, 21/16;* C25C *3/34*

U.S. Cl. 204—66 **26 Claims**



1. A process for recovering metals from a sulfide ore concentrate containing lead, silver and zinc sulfides comprising the steps of:

a. chlorinating the concentrate to convert the metal sulfides to metal chlorides and convert the sulfide sulfur in the ore to elemental sulfur;

b. leaching the residue of step (a) with aqueous sodium chloride to dissolve lead and silver chlorides and remove these chlorides from the remaining solids;

c. cooling the sodium chloride leach solution to precipitate substantially all of the lead chloride followed by separating it from the leach solution;

d. recovering the silver from the lead chloride depleted leach solution remaining from step (c);

e. removing a bleed stream from the solution remaining from step (d) and recycling the remainder of the solution to the leach solution of step (b);

f. removing substantially all of the zinc and other impurities from the bleed stream;

g. subjecting the bleed stream to electrolysis to produce chlorine gas;

h. recycling the purified bleed stream to leaching step (b); and

i. recycling the chlorine gas to the chlorination step (a).

21. The process of recovering metal values from minerals of the polymorphic series of complex metal sulfides tetrahedrite-tennantite comprising:

a. subjecting the minerals to dry chlorination with chlorine gas in the absence of oxygen at a temperature between about 50° C and the melting point of sulfur to convert substantially all of the sulfide sulfur to elemental sulfur in solid form and to effect conversion of the metal compounds to metal chlorides, and recovering metal from the chlorides.

4,011,147

METHOD FOR DIAPHRAGM ELECTROLYSIS OF ALKALI METAL HALIDES

Hiroshi Fujiwara; Koichi Asano; Asao Takahashi, and Akio Sugishita, all of Saitama, Japan, assignors to Maruzen Oil Co. Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 540,467, Jan. 13, 1975, abandoned. This application Sept. 23, 1975, Ser. No. 616,114

Claims priority, application Japan, Jan. 11, 1974, 49-6375

Int. Cl.² C25B *1/16, 1/26, 13/08*

U.S. Cl. 204—98 **23 Claims**

1. A method for diaphragm electrolysis of an alkali metal halide which comprises electrolyzing an alkali metal halide solution by passing an electric current through an anode compartment and a cathode compartment of an electrolytic cell containing the alkali metal halide solution with an ion-exchange membrane of a graft copolymer of a polyolefin main chain and a side chain composed mainly of monohydroxystyrene and grafted to said polyolefin main chain separating the anode compartment and the cathode compartment.

4,011,148

METHOD OF ELECTROLYSIS

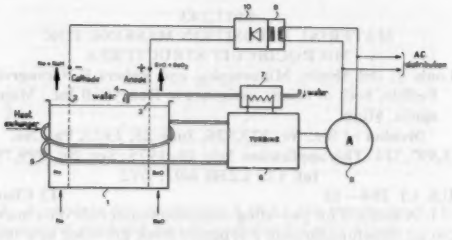
Philippe Goudal, Bures sur Yvette, France, assignor to Electricite de France (Service National), Paris, France

Continuation-in-part of Ser. No. 569,773, April 21, 1975, abandoned. This application Jan. 14, 1976, Ser. No. 648,959

Claims priority, application United Kingdom, Mar. 11, 1975, 10184/75; Belgium, Apr. 3, 1975, 155045; Germany, Mar. 21, 1975, 2512575; Italy, June 6, 1975, 49945/75; Spain, Mar. 25, 1975, 436000; Switzerland, Apr. 24, 1975, 5246/75

Int. Cl.² C25B *1/02*

U.S. Cl. 204—129 **2 Claims**



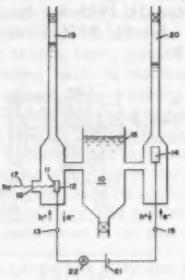
1. A method for the electrolysis of water in which the elec-

trolyte is an aqueous solution of an acid, base or salt, wherein hydrogen resulting from electrolytic decomposition is combined with a current of sodium to form sodium hydride and the oxygen resulting from the electrolytic decomposition is combined with an alkaline earth metal oxide to form an alkaline earth metal peroxide, or hyperoxide, and wherein the heat released by these combinations is converted into electric energy which is used for supplying part of the low voltage electric energy necessary for the electrolysis.

4,011,149
PHOTOELECTROLYSIS OF WATER BY SOLAR RADIATION

Arthur Jack Nozik, Summit, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Nov. 17, 1975, Ser. No. 632,557
Int. Cl.² C25B *1/04*; H01L *31/04*
U.S. Cl. 204—129 **23 Claims**



1. A photoelectrolysis cell for producing hydrogen from solar radiation comprising

a. an electrode compris...g an outer, chemically inert thin film semiconducting layer supported on at least one inner thin film semiconducting layer of some conductivity type as said outer layer, which is disposed on a supporting conductive substrate, each layer having a bandgap which ranges from about 1.3 to 4.0 eV;

b. a counter-electrode;

c. means for retaining an electrolyte disposed between the electrode and the counter-electrode;

d. external bias means between the electrode and the counter-electrode for biasing the electrode with from 0 to about −1 V; and

e. means for collecting hydrogen produced.

2. The cell of claim 1 in which the electrode comprises at least one suitably doped n-type composition selected from the group consisting of TiO_2, In_2O_3, SnO_2, GaAs, GaP, CdS, Si and $MTiO_3$, where M is at least one element selected from the group consisting of La, Ba, Sr, the rare earth elements and the transition metal elements.

11. A process for producing hydrogen from solar radiation comprising

a. exposing to solar radiation an electrode in contact with an electrolyte in turn having a counter-electrode in contact therewith, said electrode comprising an outer, chemically inert thin film semiconducting layer supported on at least one inner thin film semiconducting layer of some conductivity type as said outer layer, said layers being disposed on a supporting conducting substrate, each layer having a bandgap which ranges from about 1.3 to 4.0 eV;

b. applying a bias between the electrode and the counter-electrode of from 0 to about −1 V; and

c. collecting hydrogen produced.

4,011,150
METHOD OF TREATING REFINING SEGMENTS

Per Viking Peterson, Sundsvall, Sweden, assignor to SCA Development Aktiebolag, Sundsvall, Sweden

Filed Apr. 28, 1975, Ser. No. 571,910
Claims priority, application Sweden, May 10, 1974, 7406259
Int. Cl.² C25F *3/06, 3/02*
U.S. Cl. 204—129.35 **7 Claims**

1. A method for treating the metal surface of refining elements to be employed in the defibering of cellulosic materials, said surface including grooves and ridges, which comprises polishing the metal surface of said ridges by grinding, thereby adding a polished surface layer to said ridge surfaces, removing said added surface layer prior to use of said refining elements in said defibering and attacking the surface of said refining elements, thereby loosening the microstructure and roughening the surface of said refining element, so that said surface of said refining element will wear substantially uniformly during use, said removal of said added surface layer being subsequent to any polishing of the surface of said ridges, so that said surface of said ridges is substantially free of any added polished surface layer and includes a loosened microstructure and a roughened surface during use thereof.

4,011,151
PROCESS FOR PURIFYING WASTE WATER BY ELECTROLYSIS

Takuji Ito, Tokyo, and Hisao Yamazaki, Machida, both of Japan, assignors to Nippon Risui Kagaku Kenkyusho, Japan

Continuation-in-part of Ser. No. 484,858, July 1, 1974, Pat. No. 3,915,820. This application July 15, 1975, Ser. No. 596,158
Claims priority, application Japan, July 6, 1973, 48-76887
Int. Cl.² C02B *1/82*; C02C *5/12*
U.S. Cl. 204—149 **3 Claims**

1. A process of purifying waste water by electrolysis in two steps wherein the first step comprises:

carrying out said electrolysis of the waste water at a pH of about 7 by dipping an iron anode and a carbon cathode in said waste water to be purified, energizing said electrodes until a pH of 11 is reached, removing the precipitate thus formed; and wherein the second step comprises lowering the filtrate to a pH of about 4 and carrying out a second electrolysis by dipping therein an iron anode and a carbon cathode and energizing said electrodes.

4,011,152
SYSTEM FOR AUTOCONTROLLING AND REGULATING THE AVERAGE VALUE OF THE VOLTAGE APPLIED TO PROCESSES FOR THE ELECTROLYTIC COLORING OF ANODIZED ALUMINUM

Dionisio Rodriguez-Martinez, Alicante, Spain, assignor to Empresa Nacional del Aluminio, S.A., Alicante, Spain

Filed Oct. 6, 1975, Ser. No. 620,538
Claims priority, application Spain, Mar. 12, 1975, 437604
Int. Cl.² C25D *9/06*
U.S. Cl. 204—228 **3 Claims**

1. Apparatus for electrolytically coloring anodized aluminum, comprising:

a power transformer having a primary winding for connection with a source of alternating current and having a secondary winding which has one phase connected directly to the charge and its other phase connected to the charge through two anti-parallel thyristors;

first trigger means connected to one of said thyristors, said first trigger means being operative to trigger said one thyristor in accordance with a predetermined program;

second trigger means connected to the other thyristor and including means for detecting unbalance in the average values of the voltages applied to the charge in consecutive half cycles of the alternating current applied to the

charge, whereby said second trigger means are operative to trigger said other thyristor in such a manner as to eliminate such unbalance

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4,011,153

LIQUEFACTION AND DESULFURIZATION OF COAL USING SYNTHESIS GAS

Yuan C. Fu, Bethel Park, Pa., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 1, 1975, Ser. No. 564,182

Int. Cl.² C10G *1/08*

U.S. Cl. 208—10 **4 Claims**

1. A process for desulfurizing and liquifying coal while increasing the hydrogen to carbon monoxide ratio of the treat off-gas comprising:

heating at 425° to 450° C. under a pressure of 1500 to 5000 psig, a slurry of coal in a slurry liquid selected from the group consisting of tar, anthracene oil, heavy petroleum oils and fuel oil product, and a treat gas of hydrogen, carbon monoxide and steam, said steam being present in the ratio of liquid water to feed stock of about 5:100 to 15:100, in a reactor in the presence of a desulfurizing catalyst selected from the group consisting of cobalt molybdate supported on alumina, silica-stabilized cobalt molybdate supported on alumina, and nickel molybdate supported on alumina, and an alkali metal catalyst selected from the group consisting of sodium carbonate, potassium carbonate and sodium formate, whereby the coal is desulfurized and liquified to a fuel oil product and the ratio of hydrogen to carbon monoxide in the treat off-gas is increased.

4,011,154

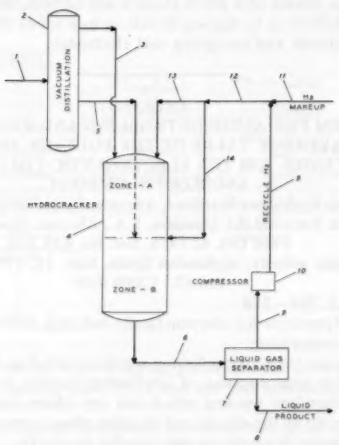
PRODUCTION OF LUBRICATING OILS

Bruce E. Stangeland, Berkeley, and Harold F. Mason, Moraga, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 345,150, March 26, 1973, abandoned. This application June 18, 1976, Ser. No. 697,670

Int. Cl.² C10G *13/00, 37/02*

U.S. Cl. 208—59 **5 Claims**



1. A process for producing a lubricating oil base stock comprising:

1. fractionating a hydrocarbon feedstock boiling above 650° F into a plurality of fractions including at least a lower-boiling fraction and a higher-boiling fraction;

2. contacting said lower-boiling fraction and hydrogen in a first hydrocracking zone, at hydrocracking conditions, with a hydrocracking catalyst to obtain an effluent comprising:

a. hydrocarbons boiling in the range of said feedstock, and

b. hydrocarbons boiling below the boiling range of said feedstock;

3. contacting (a) said hydrocarbons formed in step (2) boiling in the range of said feedstock, (b) said higher-boiling fraction, formed in step (1) without intermediate deasphalting thereof, and (c) hydrogen in a second hydrocracking zone, at hydrocracking conditions, with a hydrocracking catalyst to obtain a lubricating oil base stock comprising a plurality of lube oil fractions of reduced viscosity index spread over the range of said lube oil fractions; and

4. recovering said lubricating oil base stock.

4,011,155

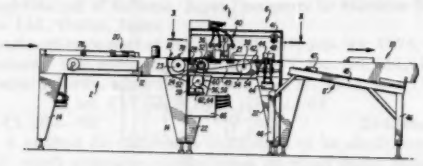
WRAPPED PACKAGE INSPECTION AND REJECTION APPARATUS

Ludwig J. Feurstein, Sheboygan; Otis E. Meives, Cleveland; Roger E. Schelk, and Larry L. Verhyen, both of Sheboygan, all of Wis., assignors to Pemco, Inc., Sheboygan, Wis.

Filed Mar. 31, 1975, Ser. No. 563,430

Int. Cl.² B07C *5/342*

U.S. Cl. 209—74 R **34 Claims**



1. An improved inspecting and sorting apparatus for essentially retangular wrapped packages of the type wherein the wrapping covers all surfaces of the wrapped product, comprising:

means for continuously conveying said packages along a path without reorienting said packages during inspection;

means for monitoring a plurality of different package wrap parameters of a continuously moving package without contacting said package, to determine whether one or more of a plurality of predetermined standards for the package wrap have been exceeded on one or more of said plurality of different, separate surfaces of said packages; and

means responsive to said parameter monitoring means for rejecting defectively wrapped packages from said conveying means.

4,011,156

METHOD FOR ELIMINATING ORGANIC AND INORGANIC BOUND NITROGEN FROM DOMESTIC AND INDUSTRIAL WASTE WATER

Max Dubach, and Alfred Scherler, both of Riedholz, Switzerland, assignors to Cellulose Attisholz, AG, Luterbach, Switzerland

Continuation of Ser. No. 308,130, Nov. 20, 1972, abandoned. This application July 12, 1974, Ser. No. 488,064

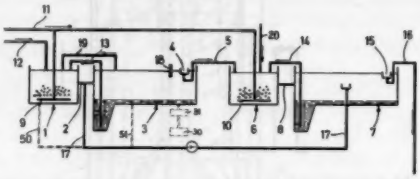
Claims priority, application Switzerland, Nov. 23, 1971, 17030/71

Int. Cl.² C02C *1/06*

U.S. Cl. 210—8 **31 Claims**

1. A method of eliminating organic and inorganic bound nitrogen from domestic and industrial waste water in a biological activated sludge waste water purification installation capable of directly processing unclarified waste water comprising two stages connected in series for producing biologically

treated waste water containing sludge in each stage, each stage containing an aeration tank and a subsequently connected settling basin, wherein the waste water is aerated in the first stage and is subsequently introduced into the settling basin of the first stage where a clarified effluent is transferred into the second stage aeration tank where it is again aerated and subsequently introduced into the settling basin of the second stage, the improvement comprising the steps of: aerating influent waste water containing organic and inorganic bound nitrogen in the aerating tank of the first stage and ammonifying the organic bound nitrogen, transferring the ammonified waste water which also contains nitrates therein



to the settling basin of the first stage where denitrification of the nitrate occurs, said aeration step being controlled to maintain a substantially zero oxygen level in the clarified effluent leaving the first stage settling basin, transferring the clarified effluent from the settling basin of the first stage which is substantially free of oxygen and containing ammonia to the aeration tank of the second stage and aerating to an oxygen level of at least about 2mg/l to provide an aerobic condition in the second stage for nitrification of the ammonia to nitrates, continuously recirculating a portion of the clarified effluent from the settling basin of the second stage and which contains nitrates back into the first stage, and denitrifying the recirculated portion of the waste water in the first stage.

4,011,157

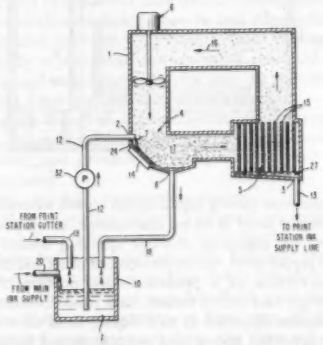
ULTRASONIC REMOVAL OF SOLID IMPURITIES FROM RECIRCULATING INK

William Boone Pennebaker, Jr., Carmel; Keith Samuel Pennington, Somers; Hugo Karl Seitz, Putnam Valley, all of N.Y., and Frederick Hochberg, deceased, late of Yorktown, N.Y., by Lee Hochberg, administratrix, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 30, 1976, Ser. No. 653,813

Int. Cl.² B01D *43/00*

U.S. Cl. 210—19 **5 Claims**



5. A method for purifying ink contaminated with solid impurities in an ink jet printer ink recirculation system comprising the steps of:

subjecting the contaminated ink to ultrasonic vibrations to form said ink into an aerosol;

removing said solid impurities:

entraining said aerosol of ink in an air stream moving under pressure for carrying said aerosol away from the source of ultrasonic vibrations; and

reliquefying said aerosol for utilization at a print station.

4,011,158

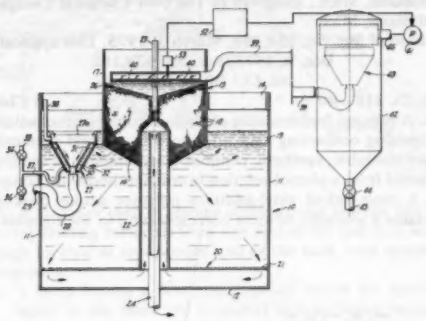
OIL-WATER SEPARATION PROCESS AND APPARATUS

Danny G. Cook, Walnut Creek, Calif., assignor to Liquid Processing Systems, Inc., San Leandro, Calif.

Continuation-in-part of Ser. No. 465,168, April 26, 1974, abandoned. This application May 23, 1975, Ser. No. 580,537

Int. Cl.² B01D *13/00*

U.S. Cl. 210—23 R **10 Claims**



1. A method for the separation of oil from a dispersion of oil in water comprising:

a. forming an enclosed physical oil coalescing zone comprising an oil coalescing medium disposed above a lower liquid permeable wall,

b. disposing and coalescing zone above an aqueous reservoir so that said reservoir forms a continuous water phase in contact with said liquid permeable wall,

c. forming an oil layer floating above and in contact with said water phase,

d. passing said dispersion downwardly through said oil coalescing zone into said reservoir through said permeable wall at increasing depths in a radially inward direction,

e. maintaining said oil layer in a quiescent laminar condition in the upper region of said liquid reservoir,

f. removing oil from the floating oil layer, and

g. withdrawing purified water from the lower portion of said reservoir at a radially outward distance from said coalescing zone so that the flow of water continues in a downward direction from the coalescing zone outwardly until withdrawal causing the flow of water to decelerate along the outward path.

4,011,159

METHOD OF REMOVAL OF PETROLEUM PRODUCTS FROM SOLID OR LIQUID SURFACES

Claude Stein, and André Marbach, both of Verneuil-en-Halatte, France, assignors to Societe Chimique des Charbonnages, Paris, France

Filed Oct. 24, 1975, Ser. No. 625,838

Claims priority, application France, Oct. 24, 1974, 74.35709

Int. Cl.² B01D *15/00*

U.S. Cl. 210—40 **7 Claims**

1. A method of removal of petroleum products from solid and from liquid surfaces, comprising

forming a strong, solid, rubbery, self-supporting film of polymer and said petroleum product by covering said petroleum product with a finely-divided solid polymer selected from the group consisting of poly(bicyclo

[2.2.1]heptene-2) and poly(methyl-5 bicyclo [2.2.1]heptene-2) mainly obtained by opening the cycle of bicyclo [2.2.1]heptene-2 and its methyl derivative; and

removing said strong, solid, rubbery self-supporting film from the solid or liquid surface.

4,011,160
PROCESS OF USING OXAZOLINE AND/OR OXAZINE-MODIFIED POLYMERS

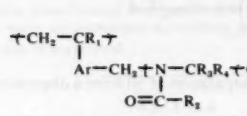
Thomas A. Chamberlin, and Norman L. Madison, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 554,380, March 3, 1975. This application Dec. 9, 1975, Ser. No. 639,152

Int. Cl.² B01D *15/00*

U.S. Cl. 210—40 **5 Claims**

1. A process for removing phenolics from a phenol solution comprising contacting said solution with a liquid-permeable, water-insoluble, synthetic resinous body, capable of removing a phenol from a phenol solution in contact therewith, comprising a cross-linked vinyl-addition polymer whose backbone contains a plurality of units corresponding to the formula



wherein:

R_1 is hydrogen or methyl;

R_2 is hydrogen, phenyl or alkyl of from 1 to about 24 carbon atoms;

R_3–R_6 are each independently hydrogen, lower alkyl or hydroxy-substituted lower alkyl, with the proviso that at least two of R_3–R_6 are hydrogen;

Ar is a carbocyclic aromatic nucleus;

m is 0 or 1;

n is an integer of at least 1; and

X is Cl, Br, I, or OH.

4,011,161
TREATMENT OF WASTE WATER PRODUCED IN THE MANUFACTURE OF EXPANDABLE POLYSTYRENE

Karl Hugo Popp, Frankenthal; Klaus Hess, Bad Durkheim; Werner Simmler, Ludwigshafen; Richard Stickel, and Ludwig Zuern, both of Bad Durkheim, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

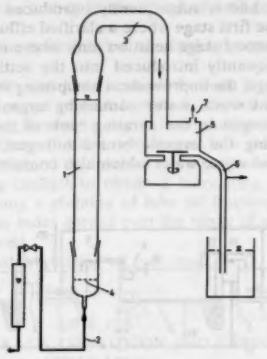
Continuation of Ser. No. 337,658, March 2, 1973, abandoned. This application Jan. 23, 1975, Ser. No. 543,522

Claims priority, application Germany, Mar. 2, 1972, 2209986

Int. Cl.² C02C *5/00*

U.S. Cl. 210—44 **7 Claims**

1. A process for the purification of waste water produced in the manufacture of expandable polystyrene in aqueous suspension and in the presence of protective colloids based on polyvinyl pyrrolidone, said waste water containing unfoamed polystyrene beads, styrene emulsion polymers and portions of the protective colloids which consists essentially of removing suspended solids by mechanical means, diluting with water, passing a stream of small diameter gas bubbles through the



resulting liquid, and separating the resulting impurity containing foam from the waste water.

4,011,162
PIVOTABLE FLUID DIVERTER FOR RECIRCULATION SYSTEM

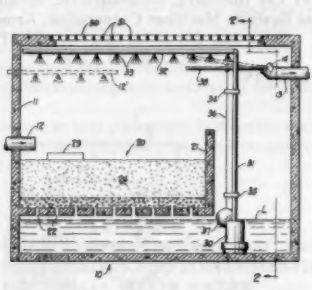
Robert R. Oldham; John H. Wooddell, both of Sidney, and Arthur L. Cain, Strongsville, all of Ohio, assignors to Robert R. Oldham, Inc., Sidney, Ohio

Filed Oct. 29, 1973, Ser. No. 410,612

The portion of the term of this patent subsequent to Feb. 5, 1991, has been disclaimed.

Int. Cl.² B01D *23/16*

U.S. Cl. 210—121 **10 Claims**

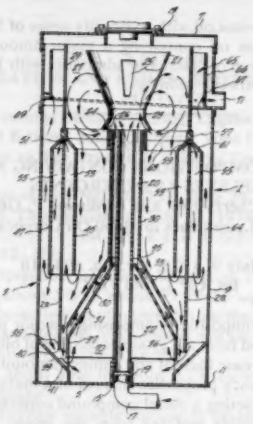


1. In a reservoir having liquid outlet means wherein a predetermined liquid level is to be maintained and liquid is to be recirculated by pumping through spraying means disposed above said liquid level, the improvement of a fluid diverter for selective diversion of a predetermined portion of pumped liquid through said outlet means, said fluid diverter comprising float means disposed in said liquid, fluid diverter means pivotally supported above said predetermined liquid level in vertically spaced relation with said float means, and flexible interconnecting means transmitting motion in tension but not in compression interconnecting said float means with said fluid diverter means to selectively place a portion of said liquid being reciculated through said spraying means in open communication with said outlet means.

4,011,163
WATER WASTE TREATMENT

Fred A. Fairbanks, 36-957 Melrose Ave., Palm Springs, Calif. 92262

Filed June 19, 1975, Ser. No. 588,244
Int. Cl.² B01D 21/08
U.S. Cl. 210—208 6 Claims

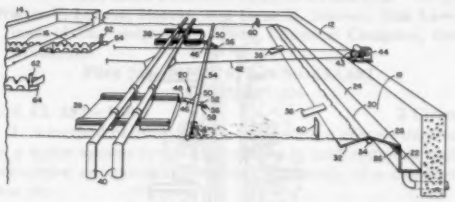


1. A sewage treatment apparatus comprising:
an outer tank defining an enclosure therewithin;
a mixing chamber positioned inside said outer tank;
a draft tube adapted for transporting sewage to be treated to said mixing chamber and an outer draft tube positioned annularly about said draft tube,
an inner tank positioned annularly about said outer draft tube, said inner tank being located below, and open to, and in communication with said mixing chamber and defining a primary settling circuit between said draft tube and said inner tank;
first and second annular walls forming first and second annular passageways, said first annular wall being positioned between said inner tank and said outer draft tube, said second annular wall being positioned between said inner tank and said outer tank, said inner tank having an aperture therein, whereby said first and second annular passageways are open to and in communication with each other, and thereby defining a secondary settling circuit;
said primary settling circuit being defined by said annular first wall of said inner tank and said outer draft tube, said outer draft tube being open to and connecting said primary and secondary circuits to said mixing chamber, whereby a portion of sewage solids removed in said primary and secondary circuits may be returned to said mixing chamber;
a pumping means positioned within said mixing chamber and adapted to introduce air into said sewage to be treated, said pumping means being further defined as comprising:
a shaft, having a passageway therein;
a hollow propeller section mounted on said shaft, said propeller section having a cavity therein, said propeller cavity being in communication with said shaft passageway, said propeller section being adapted to be submerged and rotated in a first fluid, said propeller section further comprising at least one blade having a forward and rearward face, the forward face being disposed at an angle relative to the centerline of said shaft such that the lower portion of said forward face leads the upper portion of said forward face as said shaft and propeller are rotated, the rearward face of said propeller blades being provided with a plurality of holes in communication with said propeller cavity;
a digester compartment in communication with said primary and secondary settling circuits; and
a sewage treatment outlet positioned in said outer tank and in communication with said secondary settling circuit.

4,011,164
SKIMMER APPARATUS FOR SEWAGE SETTLING TANKS AND THE LIKE

Robert F. McGivern, Columbus, Ohio, assignor to Sybron Corporation, Rochester, N.Y.

Filed Feb. 2, 1976, Ser. No. 654,559
Int. Cl.² B01D 23/02, 35/00
U.S. Cl. 210—242 R 13 Claims



1. A skimmer used in sewage settling tanks and the like for moving floating materials from one end of the tank to a scum trough located at an opposite end of the tank, said skimmer comprising:
a. a ramp having a first end disposed below the level of liquid in the tank and a second end including support means extending above the liquid level;
b. means for moving said ramp back and forth across said tank in a path of travel extending towards and away from the scum trough;
c. a boom extending transverse the ramp path of travel and being movable along said ramp from one end of said ramp to the other;
d. said boom when at said first ramp end being free floating and urged along by said ramp toward the scum trough;
e. said boom when at said second ramp end being supported by said support means above the level of liquid in the tank for movement away from the scum trough;
f. means adjacent the scum trough end of said ramp path of travel for moving said boom from said first ramp end to said second ramp end; and
g. means adjacent the end of said ramp path of travel remote from the scum trough for repositioning said boom for ultimate relocation of said boom to said first ramp end.

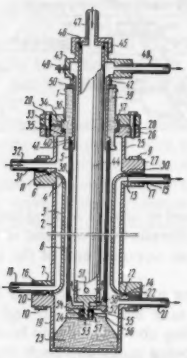
4,011,165
HIGH FREQUENCY OZONIZER

Jury Vasilievich Filippov, Leninskie gory, MGU, korpus M, kv. 159; Vsevolod Petrovich Vendillo, ulitsa Panferova, 11, kv. 99, and Nikolai Alexandrovich Ox, Michurinsky prospekt, 54, korpus 2, kv. 85, all of Moscow, U.S.S.R.

Filed July 31, 1975, Ser. No. 600,862
Int. Cl.² C01B 13/11
U.S. Cl. 250—540 3 Claims

1. A high frequency tubular ozonizer having a metal cylindrical housing with coupling flanges on both sides thereof, said flanges having branch pipes for supplying and discharging a coolant, at least one ozonizing element in said housing and comprising a low voltage tubular electrode cooled with a flow of coolant, a high voltage electrode coaxially disposed in said low voltage electrode and comprising a pipe of two parts, one of said parts being metal and being coated with a dielectric, the other of said parts comprising a metal flow outlet, said tubular parts being arranged to abutt each other; the opposing surfaces of the pipes of the low voltage and the high voltage electrodes forming a discharge gap wherein the ozone-

generating chemical reaction takes place at the moment of electric discharge; a metal pipe inside the high voltage electrode and along the axis thereof, said pipe having openings at each end thereof for admitting cooling liquid into the zone of the high voltage electrode and having and end cap with a positioning stop and a clamp at the same end for fastening the high voltage electrode; a hollow cylinder-shaped high voltage insulator for insulation of the high voltage electrode from the low voltage electrode, said insulator having a ring-shaped bead in the middle portion thereof; a metal tubular t-piece for fastening said flow outlet of said high voltage electrode in the zone of said high voltage electrode, said pipe being rigidly fastened to a free opposite end of the t-piece, a branch pipe for supplying the cooling liquid and being rigidly secured to abutt said pipe, in a zone of the pipe of the t-piece there is



provided a branch pipe through which the liquid cooling the high voltage electrode is discharged; a cylinder-shaped cup having flanges on both sides thereof for attaching flanges of said cup to said flange of the housing, a cavity in the butt end of said flange of the cup for fastening a branch pipe to supply ozonized gas, the other flange having an opening arranged along the axis of said cup, said opening and said cavity having the shape and dimensions of said bead of the high voltage insulator; a metal cap having an opening along the axis thereof, the shape and dimensions of said opening being those of the bead of said high voltage insulator; the cylindrical metal base rigidly fastened to the free end of said housing having the bottom from one side thereof and a flange from another side thereof, the butt end of said flange having an opening for fastening a branch pipe to discharge the ozonized gas.

4,011,166

SYNTHETIC LUBRICANT COMPOSITIONS

Thomas A. Schenach, Huntington Beach, Calif., assignor to Bray Oil Company, Los Angeles, Calif.

Filed Mar. 10, 1975, Ser. No. 556,947
Int. Cl.² C10M *1/16, 1/18*
U.S. Cl. 252—32.7 E **7 Claims**

1. A synthetic hydrocarbon lubricating oil composition possessing a minimum viscosity of about 8 centistokes at 210° F. (98.9° C.), a maximum pour point of about −60° F. (−51.1° C.), a maximum bromine number of about 1.0, a viscosity index of between 120, and 135, and a flash point of at least 400° F. (204.4° C.), said lubricant composition being prepared by the following process:

1. forming an admixture of benzene and anhydrous aluminum chloride in a ratio of one mole of benzene to about 0.08 to 0.15 mole of aluminum chloride;
2. adding thereto a linear alpha-olefin containing from 8 to 12 carbon atoms at a temperature sufficient to cause polymerization of the olefin and alkylation of the benzene by the olefin and polymers thereof, the ratio of olefin to benzene being between about 0.6 to 1.5 moles of olefin per mole of benzene and the ratio of aluminum chloride to olefin being between about 0.06 and 0.15 moles of aluminum chloride to one mole of olefin.
3. removing the aluminum chloride and distilling the reaction mixture to remove therefrom unreacted starting materials and simple monoalkyl benzenes, thereby obtaining the desired synthetic hydrocarbon lubricant composition.

6. A crankcase motor oil with a viscosity range of SAE 20 to SAE 30, said motor oil containing a major amount of the lubricant composition of claim **1** in admixture with 1–4% zinc dithiophosphate antiwear additives.

4,011,167

LUBRICANT COMPOSITIONS CONTAINING METAL COMPLEXES AS DETERGENTS

Sheldon Chibnik, Cherry Hill, and Ferdinand P. Otto, Woodbury, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed July 9, 1975, Ser. No. 594,410
Int. Cl.² C10M *1/54*
U.S. Cl. 252—42.7 **12 Claims**

1. A lubricant composition comprising a major proportion of a base oil selected from the group consisting of oils lubricating viscosity and grease thereof and a minor amount sufficient to improve detergency properties thereof of a metal complex prepared by (a) reacting a metal compound capable of forming a Werner complex selected from the group consisting essentially of zinc oxide, zinc carbonate, zinc acetate, zinc nitrate, nickel acetate, and nickel carbonate, at a temperature of from about 40° to about 150° C with a phenolic compound selected from the group consisting essentially of alkyl phenols containing from about 4 to about 30 carbon atoms, the reaction product of said alkyl phenols and a sulfur halide, dimers of said alkyl phenols, and said alkyl phenols which have been crosslinked with an aldehyde, to yield the metal salt of said phenolic compound; (b) reacting the resulting metal salt at a temperature of from about 25° to about 250° C with a polyamine having the formula $H_2N(C_2H_4NH)_xH$ where x is 1 to 5; and (c) reacting the resulting product at a temperature of from about 70° to about 250° C with an alkenylsuccinic anhydride characterized by a molecular weight between about 400 and about 3,000.

11. A metal complex of an alkylsuccinimide prepared by (a) reacting a metal compound capable of forming a Werner complex selected from the group consisting essentially of zinc oxide, zinc carbonate, zinc acetate, zince nitrate, nickel acetate, and nickel carbonate, at a temperature of from about 40° to about 150° C, with a phenolic compound selected from the group consisting essentially of alkyl phenols containing from about 4 to about 30 carbon atoms, the reaction product of said alkyl phenols and a sulfur halide, dimers of said alkyl phenols, and said alkyl phenols which have been crosslinked with an aldehyde, to yield the metal salt of said phenolic compound; (b) reacting the resulting metal salt at a temperature of from about 25° to about 250° C with a polyamine having the formula $H_2N(C_2H_4NH)_xH$ where x is 1 to 5; and (c) reacting the resulting product at a temperature of from about 70° to about 250° C with said alkenylsuccinic anhydride further characterized by a molecular weight between about 400 and about 3,000.

4,011,168

ARC TRACK RESISTANT COMPOSITION

John G. Uhlmann, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed May 6, 1974, Ser. No. 466,927
Int. Cl.² H01B *3/18*
U.S. Cl. 252—63.7 **8 Claims**

1. A composition consisting essentially of 20 to 50 percent by weight of a siloxane fluid having a viscosity in the range of 100 to 5000 centistokes at 25° C., the substituents on the

silicon atoms in the siloxane fluid being hydrocarbon radicals containing 1 to 18 carbon atoms, 50 to 80 percent by weight of a mineral filler selected from the group consisting of clays, ground quartz, gypsum, silica and aluminum, and which also contains up to 6 percent by weight of a siloxane resin composed of SiO_2 and $(CH_3)_3SiO_{1/2}$ units, the ratio of the SiO_2 units to the $(CH_3)_3SiO_{1/2}$ units being in the range of 1:0.6 to 1:1.2.

4,011,169
STABILIZATION AND ENHANCEMENT OF ENZYMATIC ACTIVITY

Francis Louvaine Diehl, Wyoming; Eugene Zeffren, Montgomery, and Edward John Milbrada, West Chester, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 375,251, June 29, 1973, Pat. No. 3,944,470. This application Jan. 28, 1976, Ser. No. 653,170
Int. Cl.² C11D *3/395*
U.S. Cl. 252—95 **10 Claims**

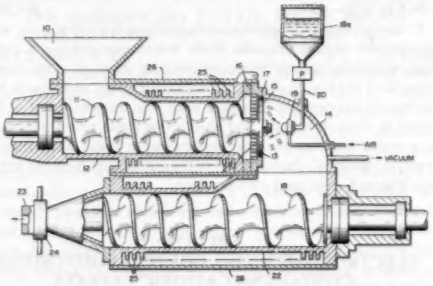
1. A detergent composition consisting essentially of:
   a. from about 5% to about 99.9% by weight of an organic surface-active agent selected from the group consisting of anionic, nonionic, zwitterionic and ampholytic detergents and mixtures thereof; and
   b. from about 50% to about 0.1% by weight of a mixture comprising
      i. an enzyme suitable for use in detergent compositions; and
      ii. an aminated polysaccharide selected from the group consisting of aminated starch and aminated cellulose having from about 0.01% to about 2% by weight of nitrogen in its elemental composition;

wherein the weight ratio of said enzyme to said aminated polysaccharide is in the range from about 1:500 to 1:1.

4,011,170
MARBLED DETERGENT BARS

John Harlan Pickin, 1 Woodside Road, Madison, Morris County, N.J. 07940; Russell Edward Compa, 24 McClellan Terrace, West Orange, Essex County, N.J. 07052, and Hargovind H. Joshi, 1214 Brookside Road, Piscataway, Middlesex County, N.J. 08854

Filed July 10, 1974, Ser. No. 487,199
Int. Cl.² B29F *3/12*; B29B *1/04*; C11D *17/00, 13/18*
U.S. Cl. 252—134 **9 Claims**



1. A method for producing marbled detergent bars comprising the steps of supplying a base detergent material to the inlet of the upper barrel of a double-barrel plodder apparatus having a vacuum chamber between the upper and lower barrels, subjecting the base detergent material to plodding in said upper barrel, extruding said base detergent material through a pressure plate disposed on the downstream side of said upper barrel and into said vacuum chamber in the form of strands, cutting said strands into segments, said segments having a geometric ratio from about 2 to about 12, supplying a liquid coloring agent to said vacuum chamber, spraying said liquid coloring agent in atomized form onto said segments falling into the vacuum chamber from the upper barrel pressure plate, plodding said base detergent material and said liquid coloring agent in the bottom barrel of said plodder apparatus to form a marbled detergent mass, extruding said marbled detergent mass as a billet, cutting said billet into bars and pressing said bars into a predetermined shape.

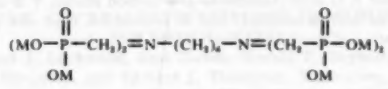
4,011,171
BOILER TREATMENT USING AMINES AND ORGANOPHOSPHONATE MATERIALS

Walter F. Lorenc, Harvey, and Dean H. Joneson, Oak Lawn, both of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Jan. 29, 1976, Ser. No. 653,681
Int. Cl.² C02B *5/06*
U.S. Cl. 252—180 **2 Claims**

1. A method of inhibiting the precipitation of scale deposits in a water system comprising adding to said system a scale preventive composition consisting essentially of a combination of:

A. An oganophosphonate material having the formula:



where M is selected from the group consisting of H, NH_4, alkali metal and combinations thereof; and

B. An amine selected from the group consisting of dihydroxyethylethylenediamine, trihydroxyethylethylenediamine, tetrahydroxyethylethylenediamine and aminoethylethanolamine and combinations thereof; in which the scale preventive composition is added to the system in a range of from 5:1 to 1:100, based on the hardness of said system.

4,011,172
BLEACHING ARTICLES

Mario Stephen Marsan, Cincinnati; Francis Louvaine Diehl, Wyoming, and James Byrd Edwards, Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 27, 1975, Ser. No. 562,529
Int. Cl.² C11D *3/395, 7/54*; D06L *3/06*
U.S. Cl. 252—187 R **4 Claims**

1. An article especially adapted for bleaching fabrics in an automatic clothes dryer, comprising:
   a. a thickened chlorine bleaching composition characterized by a viscosity in the range from 200 cps to 100,000 cps wherein the composition has an available chlorine content of from about 0.5% to about 15% by weight and a pH of from 8 to 11 and wherein the composition is thickened with a thickener selected from the group consisting of colloidal silicas, water-swellable and water-soluble polyacrylamides, cellulose derivatives, clays, and mixtures thereof; and
   b. a water-insoluble dispensing means holding the bleaching composition characterized by being in the form of a pouch having perforations of a diameter from about 0.05 mm to about 3 mm or embossed in such a manner that upon rupture perforations are formed having a diameter of from about 0.05 mm to about 3 mm.

4,011,173
MODIFIED NEMATIC MIXTURES WITH POSITIVE DIELECTRIC ANISOTROPY

Ralf Steinstrasser, Darmstadt, Germany, assignor to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Continuation-in-part of Ser. No. 277,502, Aug. 3, 1972. This application Apr. 17, 1974, Ser. No. 461,653

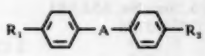
Claims priority, application Germany, Apr. 28, 1973, 2321632

Int. Cl.² C09K *3/34;* **G02F** *1/13*

U.S. Cl. 252—299 **33 Claims**

1. A modified liquid crystal nematic mixture having positive dielectric anisotropy and an enantiotropic nematic mesophase of about 20° to 80° C. extending over temperatures from 0° to 30° C., comprising an admixture of:

a. at least one nematic compound of the formula

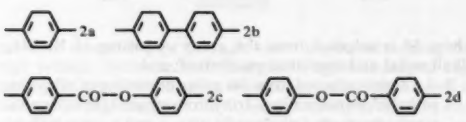


wherein A is azoxy or carbonyloxy and R_1 and R_2 are each straight-chain alkyl or alkoxy of 1–8 carbon atoms; and

b. at least one compound of the formula

X - R - Y

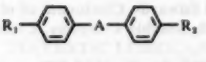
wherein X is dialkylamino of 2–4 carbon atoms; Y is cyano, nitro or trifluoromethyl; and R is selected from the group consisting of divalent radicals of the formulae



characterized in that component (b) is present in an amount sufficient to increase the dielectric anisotropy of the admixture to a value of at least +2.

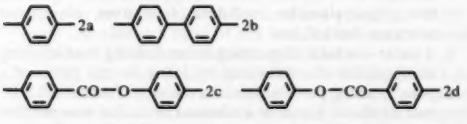
11. A modified liquid crystal nematic mixture having positive dielectric anisotropy and an enantiotropic nematic mesophase of about 20° to 80° C. extending over temperatures from 0° to 30° C., comprising an admixture of:

a. 20–95% by weight of at least one nematic compound of the formula



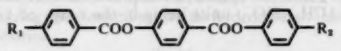
wherein A is azoxy or carbonyloxy and R_1 and R_2 are each straight-chain alkyl or alkoxy of 1–8 carbon atoms;

b. 3–65% by weight of at least one compound of the formula X — R — Y wherein X is straight-chain alkyl of 4–9 carbon atoms or dialkylamino of 2–4 carbon atoms; Y is cyano, nitro or trifluoromethyl when X is dialkylamino, and Y is nitro or trifluoromethyl when X is straight-chain alkyl; and R is selected from the group consisting of divalent radicals of the formulae



characterized in that component (b) is present in an amount sufficient to increase the dielectric anisotropy of the admixture to a value of at least +2; and

c. 2–27% by weight based on the total composition of at least one compound of the formula



wherein R_1 and R_2 are each alkyl or alkoxy of 1–8 carbon atoms, said component (c) being present in an amount sufficient to compensate the clearing-point-lowering effect of the addition of component (b) to the nematic component (a).

4,011,174
WATER WASHABLE DYE PENETRANT COMPOSITION AND METHOD OF APPLICATION

Orlando G. Molina, Westminster, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Continuation-in-part of Ser. No. 444,433, Feb. 21, 1974, Pat. No. 3,915,886, and a continuation-in-part of Ser. No. 521,730, Nov. 7, 1974, Pat. No. 3,939,092. This application May 23, 1975, Ser. No. 580,258

Int. Cl.² C09K *11/06;* **G01N** *19/08, 21/16*

U.S. Cl. 252—301.19 **16 Claims**

1. A water washable biodegradable liquid dye penetrant composition for use in non-destructive testing for detecting cracks and flaws in the surface of an object, which consists essentially of (1) a single biodegradable nonionic surfactant which consists essentially of ethoxylates of linear secondary aliphatic alcohols, with the hydroxyl groups randomly distributed, the liner aliphatic portion of said alcohols being a mixture of alkyl chains containing in the range from 10 to 17 carbon atoms, and containing an average of from 3 to 12 moles of ethylene oxide, (2) a dye soluble in said surfactant and (3) glycol monobutyl ether as extender.

4,011,175
COMPOSITION FOR SEPARATING HYDROCARBONS FROM WATER

Paul Preus, 21 Smith Road, Toms River, N.J. 08753

Continuation of Ser. No. 292,886, Sept. 28, 1973, Pat. No. 3,855,152, which is a division of Ser. No. 83,640, Oct. 24, 1970, abandoned. This application Aug. 15, 1974, Ser. No. 497,712

Int. Cl.² B01J *31/02;* **B01D** *15/00*

U.S. Cl. 252—427 **6 Claims**

1. oleophilic-hydrophobic composition for separating water immiscible organic liquids from water comprising a lighter than water demoisturized comminuted mass of a mixture of expanded perlite, asphalt and a fibrous filler, said loose mass having an average particle size with one dimension of at least about ⅛ inch in length, and said loose mass when introduced in a water-organic material system selectively absorbing the organic material therein for subsequent mechanical separation thereof with said composition.

4,011,176
ELECTROCONDUCTIVE COATING COMPOSITION CONTAINING CATIONIC LATEXES

Frank L. Saunders; Donald A. Kangas, and Ralph E. Friedrich, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jan. 31, 1975, Ser. No. 546,044

Int. Cl.² H01B *1/04*

U.S. Cl. 252—500 **10 Claims**

1. An aqueous coating composition comprising (1) a water-dispersible cationic electroconductive polymer having chemically bound to its backbone a number of pendant cationic moieties such that the polymer has a volume resistivity less than 10^7 ohm centimeters at 17% relative humidity and (2) a

latex of a normally solid thermoplastic organic addition polymer containing an amount of a cationic surface active agent sufficient to stabilize the latex, said electroconductive polymer being present in an amount from about 15 to about 85 dry weight parts per 100 dry weight parts of the composition provided that said amount is such that the surface electrical resistivity of a non-conductive substrate having its surface coated with said composition is a value no greater than 10^{12} ohms at 10% relative humidity and said latex being present in an amount from about 15 to about 85 dry weight parts of per 100 dry weight parts of the composition provided said amount is sufficient to improve the solvent holdout properties of a coating of the composition in accordance with the solvent holdout method of A. S. Diamond, TAPPI, 48, 94a (10/65).

4,011,177

CHEMICALS AND THEIR USE IN PERFUMERY

Hifzur Rahman Ansari, Rayleigh; Paul Edgar Fido, London, and Horst Richard Wagner, Woodford Green, all of England, assignors to Bush Boake Allen Limited, London, England

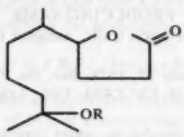
Filed June 5, 1975, Ser. No. 584,082

Claims priority, application United Kingdom, June 5, 1974, 24971/74

Int. Cl.² C07D *307/32*

U.S. Cl. 252—522 **12 Claims**

1. A compound of the formula



wherein R is an alkyl group having from 1 to 4 carbon atoms.

4,011,178

RESINS AND POLYMER MIXTURES THEREOF

Joel Muse, Medina, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 535,609, Dec. 23, 1974, abandoned. This application May 21, 1976, Ser. No. 688,812

Int. Cl.² C08K *5/01, 5/06, 5/07*; **C08L** *7/00*

U.S. Cl. 260—4 AR **13 Claims**

1. A resinous composition, suitable as a solubilizing and/or plasticizing aid for paint-type resins, characterized by enabling a fluid coating mixture with a paint-type resin comprised of at least one of styrene/2-ethylhexyl acrylate, vinyl toluene/2-ethylhexyl acrylate, styrene/1,3-butadiene and chlorinated natural rubber with a solvent, or solvent mixture, having a KB value in the range of about 30 to about 40 selected from aromatic hydrocarbons, aliphatic hydrocarbons, liquid ketones, and ethylene glycol ethers prepared by the method which comprises (A) polymerizing a monomer mixture comprising about 10 to about 90 weight percent of at least one methyl branched α-olefin selected from 3-methyl-1-butene and 4-methyl-1-pentene and, correspondingly, about 90 to about 10 weight percent aromatic monomers selected from at least one of styrene and α-methyl styrene in the presence of a catalyst selected from aluminum chloride, ethyl aluminum dichloride, boron trifluoride and boron trifluoride etherate, and in the presence of a solvent selected from aliphatic hydrocarbons containing 4 to 7 carbon atoms, aromatic hydrocarbons containing 6 to 8 carbon atoms and liquid chloro-substituted hydrocarbons containing 1 to 6 carbon atoms and (B) removing said solvent therefrom.

4,011,179

CONTINUOUS SULFUR FOAM PREPARATION USING POLYISOCYANATES

Gar Lok Woo, Tiburon, Calif.; John M. Dale, and Allen C. Ludwig, both of San Antonio, Tex., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 382,598, July 25, 1973, abandoned, which is a continuation-in-part of Ser. No. 281,587, Aug. 17, 1972, abandoned. This application Feb. 7, 1975, Ser. No. 548,061

Int. Cl.² C08J *9/00*

U.S. Cl. 260—2.5 A **15 Claims**

1. A process for the production of sulfur foam containing at least 50 weight percent sulfur, which consists essentially of:
   a. heating sulfur in a first zone to a temperature above about 100° C to obtain molten sulfur and reacting the molten sulfur with an organic protonic acid which is reactive with molten sulfur so as to incorporate the organic acid with sulfur to form a sulfur-organic acid adduct containing unreacted protonic acid groups;
   b. passing said sulfur adduct in liquid state out of said first zone and into a separate mixer; and
   c. mixing and reacting in said mixer a polyisocyanate with the unreacted acid groups of said sulfur adduct to thereby, upon removal of the polyisocyanate-acid group reaction product from the mixer, release gas and generate a foam.

4,011,180

NOVEL COCATALYST SYSTEM FOR TRIMERIZING POLYISOCYANATES

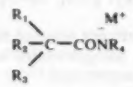
Robert J. Lockwood, East Haven; Harold E. Reymore, Jr., Wallingford, and Edward J. Thompson, Watertown, all of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 437,780, Jan. 30, 1974, Pat. No. 3,896,052. This application May 2, 1975, Ser. No. 573,908

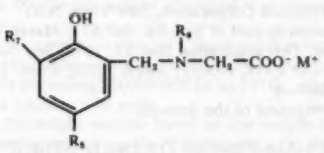
Int. Cl.² B32B *5/20*; **C08G** *18/18*

U.S. Cl. 260—2.5 AW **26 Claims**

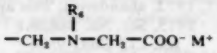
1. In a process for the preparation of a cellular polymer in which the major recurring polymer unit is isocyanurate which process comprises bringing together in the presence of a blowing agent, a polyisocyanate, a trimerization catalyst, and from about 0.01 equivalent to about 0.3 equivalent of a polyol per equivalent of isocyanate, the improvement which consists essentially of employing as the catalyst, a combination of the following ingredients:
   a. from 0.00075 to 0.03 equivalent per equivalent of said polyisocyanate of an amide salt having the formula



   wherein M is an alkali metal, R_1, R_2 and R_3 can be the same or different and are selected from the group consisting of H, lower alkyl, aryl, aralkyl, and cycloalkyl, and R_4 is selected from the group consisting of lower alkyl and aryl; and
   b. from 0.0015 to 0.025 equivalent per equivalent of said polyisocyanate of a glycine salt having the formula



wherein M is an alkali metal, R_5 is selected from the class consisting of hydrogen and alkyl having from 1 to 12 carbon atoms, inclusive, R_6 is selected from the class consisting of hydrogen, alkyl having from 1 to 12 carbon atoms, inclusive and $-CH_2-COO^-M^+$, and R_7 is selected from the class consisting of hydrogen and the group



4,011,181
POLYURETHANE FOAMS CONTAINING STANNOUS CATECHOL DERIVATIVES

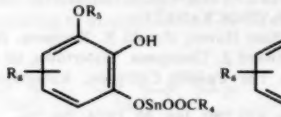
Bruce G. van Leuwen, Trumbull, and James J. Pitts, Hamden, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 375,396, July 2, 1973, Pat. No. 3,899,520. This application July 30, 1975, Ser. No. 600,244

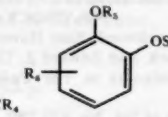
Int. Cl.² C08G *18/24, 18/14*

U.S. Cl. 260—2.5 AB **17 Claims**

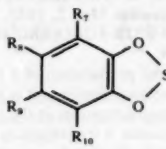
1. In a process for preparing a polyurethane foam from a reaction mixture comprising an organic polyisocyanate, a polyol, a blowing agent, and a gel catalyst, the improvement wherein said gel catalyst is a stannous catechol derivative of the formula selected from the group consisting of:



and



and



and mixtures thereof,

wherein,

R_4 represents an alkyl group having from 1 to about 9 carbon atoms or an alkenyl group having from 1 to about 9 carbon atoms,

R_5 represents an alkyl group having from 1 to about 10 carbon atoms,

R_6 represents a substituent selected from the group consisting of hydrogen, halogen, nitro and alkyl having 1 to about 10 carbon atoms, and

R_7, R_8, R_9 and R_{10} represent substituents independently selected from the group consisting of hydrogen, halogen amine, nitro, nitroso, sulfonyl and alkyl having 1 to about 10 carbon atoms.

4,011,182
CYCLIC UNDECAPEPTIDE ANALOGS OF SOMATOSTATIN AND INTERMEDIATES

Dimitrios Sarantakis, West Chester, Pa., assignor to American Home Products Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 560,671, March 21, 1975, abandoned. This application Dec. 10, 1975, Ser. No. 639,550

Int. Cl.² C07C *103/52*; **A61K** *37/00*; **C08L** *25/06*

U.S. Cl. 260—8 **15 Claims**

9. A compound of the formula

R-Lys(R^1)-Asn-Phe-Phe-Trp-Lys(R^2)-Thr(R^3)-Phe-Thr(R^4)-Ser(R^5)-R^6 III

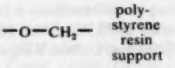
wherein Trp represents either D- or L-tryptophyl and all other chiral amino acids are of the L-configuration;

R is an α-amino protecting group that is cleavable under conditions that will not cleave the R^1 and R^2 protecting group;

R^1 and R^2 is a protecting group for the side chain amino substituent of lysine selected from the class consisting of benzyloxycarbonyl, tosyl, t-amyloxycarbonyl, t-butyloxycarbonyl, diisopropylmethoxycarbonyl and substituted benzyloxycarbonyl, said substituent selected from halo and nitro and said R^1 and R^2 group not being the same as said R group;

R^3, R^4 and R^5 are selected from the class consisting of hydrogen and a protecting group for the alcoholic hydroxyl group of threonine and serine selected from acetyl, benzoyl, tert-butyl, trityl, benzyl, 2,6 dichlorobenzyl and benzyloxycarbonyl; and

R^6 is selected from the class consisting of OH, $NHNH_2$, N_3, OCH_3 and



4,011,183
BUILDING BOARD PRODUCTS AND PROCESS FOR PRODUCING SAME

David Lee Ruff, Torrance, Calif., assignor to Grefco Inc., Bala Cynwyd, Pa.

Filed July 22, 1976, Ser. No. 707,668

Int. Cl.² C08L *5/00, 1/00*

U.S. Cl. 260—9 **29 Claims**

1. A method of producing water repellent shaped articles for construction and insulation which comprises applying to expanded perlite particles a solution of a synthetic organic binder in an organic solvent which is liquid at ambient temperatures and has a boiling point below about 150° F., said binder being capable of curing upon standing at ambient temperatures and of reacting with hydroxyl groups present in said expanded perlite, forming a mass of said particles into the desired shape, removing said solvent and curing said binder.

16. A shaped article for construction and insulation which is water repellent comprising expanded perlite particles bonded together by a synthetic organic binder, said binder being bonded to said perlite by reaction with hydroxyl groups present in said expanded perlite, said shaped article having a density of from about 10 to about 20 pounds per cubic foot.

4,011,184
BITUMEN-POLYMER COMPOSITION

Jan W. van Reijendam, and Jan van Schooten, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Mar. 17, 1975, Ser. No. 559,095

Claims priority, application United Kingdom, Mar. 28, 1974, 13746/74

Int. Cl.² C08L *91/00*

U.S. Cl. 260—28.5 R **21 Claims**

1. A process for preparing bituminous products which comprises chemically coupling a modified bitumen and a modified elastomer in the presence of ions of a metal selected from the group consisting of iron, chromium, manganese and a metal of Groups I to IV of the Periodic Table wherein said modified bitumen is a bitumen having carboxyl group substituents and wherein said modified elastomer is an elastomer having carboxyl group substituents.

4,011,185

AQUEOUS INSULATING VARNISHES

Etsuo Hosokawa, Yokohama; Misao Waki, Chiba, and Katsumi Asada, Yokohama, all of Japan, assignors to Showa Densen Denran Kabushiki Kaisha, Japan

Continuation-in-part of Ser. No. 440,212, Feb. 6, 1974, abandoned. This application Jan. 20, 1976, Ser. No. 650,599

Claims priority, application Japan, Apr. 13, 1973, 48-42013; May 25, 1973, 48-59150; Oct. 18, 1973, 48-117177; Nov. 30, 1973, 48-135152

Int. Cl.² C08G *63/76*, *63/68*; C08J *3/06*

U.S. Cl. 260—29.2 N 22 Claims

1. An aqueous insulating varnish prepared by

STAGE 1: reacting to a substantially complete degree (1) a compound selected from the group consisting of an aromatic dicarboxylic acid and a lower alkyl ester thereof, (2) an aliphatic primary diol and (3) an aliphatic alcohol having at least three hydroxyl groups in quantities satisfying the requirements:

$$\frac{a}{b+c}\left(1+\frac{c}{b+c}\right) \leqq 1 \text{ and } \frac{a}{b+c} \geqq 0.4,$$

wherein a, b and c each represent equivalent quantities greater than zero of the compounds of (1), (2) and (3), respectively;

STAGE 2: reacting the thus produced reaction product with (4) a compound selected from the group consisting of an aromatic tetracarboxylic acid and an anhydride thereof in a quantity satisfying the requirement:

$$0.5\,((b+c)-a) \leqq d \leqq 2\,((b+c)-a),$$

wherein d represents an equivalent quantity greater than zero of the compound of (4), at a temperature at which no gellation occurs and which is above the melting point of said reaction product but below the sublimation temperature of the compound of (4), and for a time during which no gellation occurs; and

STAGE 3: subsequently dispersing the resulting product in an aqueous solution containing ammonia or an organic amine.

4,011,186

AQUEOUS RESOLE RESIN SOLUTIONS HAVING DISPERSED INERT SALTS

Harold P. Higginbottom, Wilbraham, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed Feb. 18, 1976, Ser. No. 658,945

Int. Cl.² C08G *51/24*

U.S. Cl. 260—29.3 20 Claims

1. An aqueous solution of a resole resin having a pH of 3 to 8.5 comprising:

a. said resole resin having a number average molecular weight is less than about 300, a water tolerance greater than 50 percent, a combined formaldehyde to phenol ratio in the range of from about 1.0:1 to 2.9:1 and,

b. a dispersion of insoluble oxalate salt particles, wherein, said resole being prepared with a catalyst comprising alkaline earth metal hydroxides selected from the group consisting of magnesium, calcium, barium, strontium and mixtures thereof, said pH being adjusted with a compound selected from the group consisting of oxalic acid, ammonium oxalate and mixtures thereof providing a stable dispersion of insoluble oxalate salt particles of said alkaline earth metal ions in said solution, wherein said solution is stable to salt flocculation at a resole resin content of from about 40 to 95 percent by weight.

4,011,187

COATING COMPOSITIONS COMPRISING TETRAFLUOROETHYLENE POLYMERS AND ALUMINUM HYDROXYCHLORIDE

John Wilmar Edwards, Welwyn Garden City, and Barry William Farrant, St. Neots, both of England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 367,004, June 4, 1973, Pat. No. 3,900,684. This application Apr. 11, 1975, Ser. No. 567,076

Claims priority, application United Kingdom, June 9, 1972, 27011/72

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C08K *3/22*

U.S. Cl. 260—29.6 F 9 Claims

1. A liquid composition comprising polytetrafluoroethylene polymer or copolymer and an aluminium hydroxychloride wherein the weight of aluminum provided by the aluminum hydroxychloride is at least 3 g per 100 g of polymer or copolymer.

4,011,188

POWDERY COATING COMPOSITION

Jörn Rüter, Marl, and Heinz Scholten, Lippramsdorf, both of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

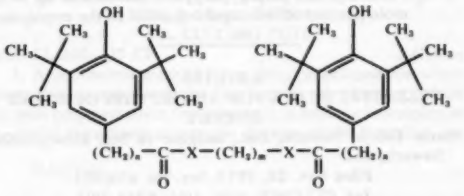
Filed Nov. 14, 1975, Ser. No. 632,016

Claims priority, application Germany, Nov. 20, 1974, 2454880

Int. Cl.² C08L *67/02*

U.S. Cl. 260—31.6 9 Claims

1. A powdery coating composition suitable for coating metallic surfaces at high temperatures, comprising powdery particles of a saturated, high-molecular weight thermoplastic polyester having an RSV value of about 0.4–1.2 dl./g. having homogeneously dispersed throughout said particles about 0.1–5% by weight, based on the weight of the polyester, of a flow agent of the formula



wherein

n is an integer of 0–6;

m is an integer of 2–12; and

X is oxygen or an —NH— group.

4,011,189

URETHANES MODIFIED WITH SILOXANES

Joseph W. Keil, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Aug. 8, 1975, Ser. No. 602,933

Int. Cl.² C08J *3/08*; C08K *5/01*, *5/54*

U.S. Cl. 260—33.6 UB 12 Claims

1. A homogeneous polymeric dispersion comprising

a. 55 to 99 parts by weight of a curable urethane composition;

b. 1 to 45 parts by weight of a fluid which is incompatible with the urethane composition, said fluid having a viscosity not exceeding 20,000,000 cs. at 25° C., wherein (a) + (b) is equal to 100 parts,

c. 1 to 20 weight percent based on the weight of (b) of a dispersing agent capable of maintaining (b) dispersed in (a), said dispersing agent being a siloxane-organic copolymer selected from the group consisting of

1. siloxane-organic copolymers consisting essentially of SiO_2 units, $(CH_3)_3SiO_{1/2}$ units and $D(CH_3)_2SiO_{1/2}$ units in which D is a polyoxyethylene polymer having a molecular weight of at least 500, or a polyoxyethylenepolyoxypropylene copolymer having a molecular weight of at least 2,500 and the polyoxypropylene portion constitutes up to 50 mole percent of the organic portion of the copolymer, said D being attached to the silicon atom via a silicon-carbon bond, the ratio of the SiO_2 units to the total $(CH_3)_3SiO_{1/2}$ and $D(CH_3)_2SiO_{1/2}$ units being in the range of 1.0:0.4 to 1.0:1.2,
2. copolymers which are reaction products derived from heating a mixture of a siloxane consisting essentially of SiO_2 units and $(CH_3)_3SiO_{1/2}$ units in which the ratio of SiO_2 units to $(CH_3)_3SiO_{1/2}$ units is in the range of 1.0:0.4 to 1.0:1.2, and a hydroxylated polyoxyethylene polymer having a molecular weight of at least 500 or a hydroxylated polyoxyethylene-polyoxypropylene copolymer having a molecular weight of at least 2,500 and the polyoxypropylene constitutes up to 50 moles percent of the organic portion of the copolymer,
3. polydimethylsiloxane-organic copolymers in which the polydimethylsiloxane portion has a molecular weight of at least 1400 and the organic portion consists essentially of a polyoxyethylene polymer having a molecular weight of at least 500, or a polyoxyethylene-polyoxypropylene copolymer having a molecular weight of at least 1,000 and the polyoxypropylene constitutes up to 50 mole percent of the organic portion of the copolymer, said organic portion being attached to silicon atoms via silicon-carbon bonds, and
4. polydimethylsiloxane-organic copolymers which are reaction products produced by heating a mixture of hydroxylated polydimethylsiloxanes having a molecular weight of at least 1400, and a hydroxylated polyoxyethylene polymer having a molecular weight of at least 500, or a hydroxylated polyoxyethylene-polyoxypropylene copolymer having a molecular weight of at least 1,000 and the polyoxypropylene constitutes up to 50 mole percent of the organic portion of the copolymer.

4,011,190
SELECTIVE BLACK FOR ABSORPTION OF SOLAR ENERGY

Maria Telkes, Newark, Del., assignor to Ses, Incorporated, Newark, Del.

Filed Nov. 24, 1975, Ser. No. 634,953
Int. Cl.² C08K *3/08, 5/01;* **F24J** *3/02*
U.S. Cl. 260—33.65 B **17 Claims**

9. A black surface for absorption of solar energy comprising a substrate coated with black particles in a binder transparent to wavelengths longer than about three microns, said black particle being a reflective metal particle having an emissivity less than about 0.1 covered with a thin film of a semiconductor material which transmits wavelengths longer than 2 microns and which has an absorptivity of at least about 0.90 and a reflectivity of less than about 0.1.

4,011,191
HEAT-CURABLE SILICONE ELASTOMER COMPOSITIONS CONTAINING ALKENYLTRIACETOXYSILANES

Harold V. Lefler, III, Sanford, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Jan. 15, 1976, Ser. No. 649,290
Int. Cl.² C08L *83/04*
U.S. Cl. 260—37 SB **10 Claims**

1. An anhydrous composition, heat-curable in the presence of moisture to form an elastomeric material having a dry, non-tacky surface, said composition consisting essentially of

A. 100 parts by weight of a vinyl-enblocked polydiorganosiloxane having a viscosity of from 1 pascal-second to less than 100 pascal-seconds at 25° C. wherein the organic radicals are selected from the group consisting of monovalent hydrocarbon radicals and fluorinated monovalent hydrocarbon radicals, at least 50 percent of all organic radicals being methyl,

B. from 3 to 10 parts by weight of an alkenyltriacetoxysilane,

C. from 0.1 to 10 parts of an organic peroxide and

D. from 10 to 300 parts by weight of a filler.

4,011,192
COLORED YARNS

Gerard Lees, Harrogate, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Dec. 13, 1971, Ser. No. 207,229
Int. Cl.² C08J *3/20*
U.S. Cl. 260—37 P **13 Claims**

1. In a process for the manufacture of a yarn comprising a thermoplastic polymer and a coloring material, wherein the thermoplastic polymer in the molten state is mixed with a feed of coloring material and forwarded at a metered rate to means for forming at least one filament, the improvement whereby periodical changes are made in the rate of addition, or composition, of the coloring material feed, the successive changes being effected at a time interval greater than 0.03 T, and no greater than 10 T where T is the half-decay time for instantaneous injection of color.

4,011,193
REINFORCED THERMOPLASTIC POLYESTER COMPOSITIONS

Allen D. Wambach, Pittsfield, Mass., assignor to General Electric Company, Pittsfield, Mass.

Filed Dec. 13, 1972, Ser. No. 314,544
Int. Cl.² C08K *3/22, 7/08*
U.S. Cl. 260—40 R **7 Claims**

1. A reinforced thermoplastic composition comprising:

a. a high molecular weight poly(1,4-butylene terephthalate) resin, and

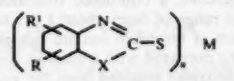
b. potassium titanate, substantially in the form of single crystal filaments, in a minor proportion based on said composition, in an amount at least sufficient to reinforce the composition but in an amount not in excess of that which embrittles the composition.

4,011,194
SMOKE RETARDANTS FOR POLYVINYL HALIDES AND POLYSTYRENES

Stanley Robert Sandler, Springfield, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed Oct. 16, 1975, Ser. No. 623,152
Int. Cl.² C08K *5/59, 5/47, 5/36*
U.S. Cl. 260—45.75 C **16 Claims**

1. A smoke-retardant polymer composition comprising a resin selected from the group consisting of polyvinyl halide and polystyrene admixed with a sufficient amount to reduce smoking of a metal-2-mercaptobenzothiazole, metal-2-mercaptobenzoxazole, or metal-2-mercaptobenzimidazole having the general structure:



where

a. R, R^1 and R^2 are independently selected from the class consisting of hydrogen, alkyl of 1 to 4 carbons, aryl of 6 to 12 carbons, and alkylaryl of 7 to 12 carbons, in addition R and R^1 can be selected from a halogen;

b. X is selected from oxygen, sulfur or an NR^2 group;

c. M is a metal selected from the class consisting of beryllium, magnesium, calcium, strontium, barium, titanium, zirconium, antimony, bismuth, chromium, molybdenum, tungsten, manganese, iron, ruthenium, osmium, cobalt, rhodium, iridium, nickel, palladium, platinum, copper, silver, mercury, aluminum, germanium, and lead; and

d. *n* is an integer equal to the valence of the metal M.

4,011,195

POLYMERIZABLE COMPOSITIONS CONTAINING UNSATURATED POLYESTER RESINS AND AQUEOUS ALKALI METAL SILICATE, METHOD OF PREPARING SHAPED ARTICLES FROM SUCH COMPOSITIONS AND THERMOSET PRODUCTS THEREOF

James M. Self, Taylor, S.C., assignor to H. H. Robertson Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 460,489, April 12, 1974, abandoned. This application Jan. 29, 1975, Ser. No. 544,966

Int. Cl.² C08K *3/34*

U.S. Cl. 260—40 R **28 Claims**

1. A polymerizable composition consisting essentially of the alkaline reaction product of (a) one part by weight of unsaturated polyester resin syrup; and (b) 0.3 to 10 parts by weight of aqueous sodium silicate; said composition including a polymerization initiator for unsaturated polyester resin syrup, wherein the said aqueous sodium silicate contains 45 to 85 parts by weight water and 55 to 15 parts by weight of sodium silicate solids having a weight ratio of SiO_2Na_2O of 1.5 to 3.75.

4,011,196

STABILIZED POLYESTER RESIN AND PROCESSES FOR MAKING THEM

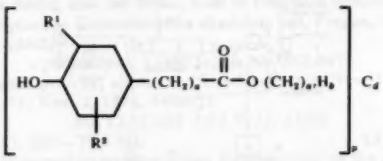
Frank E. Carevic, West Chester, Pa., and Anthony Labriola, Pennsville, N.J., assignors to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 173,284, Aug. 19, 1971, abandoned. This application Nov. 16, 1972, Ser. No. 307,017

Int. Cl.² C08K *5/52*, *5/13*, *5/12*

U.S. Cl. 260—45.85 B **4 Claims**

1. A process for producing a fiber or film-forming polyester having improved resistance to deterioration by heat and moisture comprising polycondensing bis 2-hydroxy ethyl terephthalate formed by transesterification, or intermediate condensation products thereof, in the presence of a zinc organic acid salt transesterification catalyst, a phosphorus acid or ester thereof, and a stabilizing amount of a hindered phenol represented by the formula:



in which R^1 and R^2 are lower alkyls of the group consisting of isopropyl, tertiary butyl and neopentyl, with R^1 in a position ortho to the hydroxyl group and R^2 in the other position ortho to the hydroxyl group or in the other position meta to the hydroxyl group and para to R^1 and in which *a* and *a'* each has a value of from 0 to 18 inclusive, *b* has a value of 0 or 1, *d* has a value of 0 or 1 and *p* has a value of 1 or 4, and in which when *p* has a value of 1, *b* has a value of 1 and *d* has a value of 0, and when *p* has a value of 4, *b* has a value of 0 and *d* has a value of 1.

4,011,197

METHOD OF CURING ORGANOSILOXANE COMPOSITIONS USING MICROWAVES

Chi-Long Lee, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Sept. 18, 1975, Ser. No. 614,466

Int. Cl.² C08G *77/04*

U.S. Cl. 260—46.5 R **7 Claims**

1. A method of curing a siloxane composition comprising exposing an organosiloxane composition to a microwave source having frequencies of from 900 to 5,000 mega Hertz until the organosiloxane has cured to a three dimensional network, said organosiloxane composition comprising an organosiloxane polymer and a heat accelerated curing mechanism, the organosiloxane composition having at least five weight percent of the silicon-bonded organic radicals selected from the group consisting of aryl radicals, chlorinated aliphatic hydrocarbon radicals, fluorinated aliphatic hydrocarbon radicals, hydrocarbon radicals having at least one carbon-bonded mercapto group, hydrocarbon radicals having at least one carbinol group and aliphatic hydrocarbon ether radicals, wherein all the organic radicals are bonded to silicon atoms through silicon-carbon bonds and any atom other than carbon or hydrogen being separated from the silicon atom by at least three carbon atoms, any remaining silicon-bonded organic radicals bonded to the silicon atom through silicon-carbon bonds in the organosiloxane composition being aliphatic hydrocarbon radicals.

4,011,198

METHOD FOR MAKING POLYETHERIMIDES

Tohru Takekoshi, Scotia, N.Y., and John E. Kochanowski, Pittsfield, Mass., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 459,073, April 8, 1974, and a continuation-in-part of Ser. No. 319,372, Dec. 29, 1972, Pat. No. 3,803,085. This application Feb. 13, 1975, Ser. No. 549,469

The portion of the term of this patent subsequent to Apr. 9, 1991, has been disclaimed.

Int. Cl.² C08G *73/10*

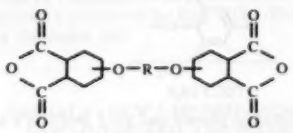
U.S. Cl. 260—47 CP **3 Claims**

1. A continuous method for making polyetherimide which comprises, continuously feeding into an extruder maintained at melt polymerization temperatures, a mixture containing as essential ingredients an organic diamine of the formula,

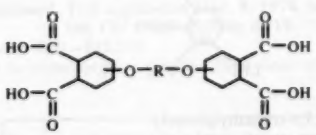
$$H_2NR^1NH_2,$$

and

an aromatic bis(etherdicarbonyl) compound selected from the class consisting of dianhydride of the formula,



and tetra-carboxylic acid of the formula,



and continuously venting water of reaction therefrom at temperatures up to 350° C, where R is a divalent aromatic organic

radical having from 6–30 carbon atoms, R^1 is a divalent organic radical selected from R radicals, alkylene radicals having from 2–20 carbon atoms, cycloalkylene radicals, and $C_{(2-8)}$ alkylene terminated polydiorganosiloxane radicals.

4,011,199
ACIDOLYSIS PROCESS

Finley E. McFarlane, and Thomas G. Davis, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

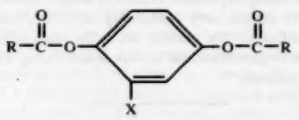
Filed Nov. 28, 1975, Ser. No. 636,186
Int. Cl.² C08G *63/22*
U.S. Cl. 260—47 C **3 Claims**

1. A process for preparation of a polyester having an inherent viscosity of at least 0.5 comprising contacting within a temperature range of 275° C. to 375° C., under polyester forming conditions,

A. a dicarboxylic acid component comprised of

1. from 60 to 35 mole percent terephthalic acid,
2. from 40 to 65 mole percent isophthalic acid, and

B. a diol component corresponding to the structure



wherein

R is a monovalent alkyl, aromatic or alicyclic radical, and

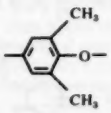
X is —Cl, —Br or a monovalent alkyl radical having 1 to 4 carbon atoms.

4,011,200
NOVEL POLYPHENYLENE ETHER AND PROCESS FOR PREPARING THE SAME

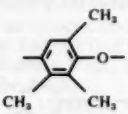
Eiichi Yonemitsu, Kashiwa; Akitoshi Sugio, Omiya, and Takao Kawaki, Tokyo, all of Japan, assignors to Mitsubishi Gas Chemical Co., Ltd., Japan

Filed Mar. 4, 1975, Ser. No. 555,129
Claims priority, application Japan, May 25, 1974, 49-59197
Int. Cl.² C08G *65/44*
U.S. Cl. 260—47 ET **12 Claims**

1. A polyphenylene ether random copolymer excelling in heat resistance and resistance to solvents, said copolymer being composed of 50–98 mol% of a structural unit of the formula



derived from 2,6-dimethyl phenol and 50–2 mol% of a structural unit of the formula



derived from 2,3,6-trimethylphenol,

each of said structural units being randomly arranged in the polymeric structure, said copolymer having an intrinsic viscosity, as measured in chloroform at 25° C., of at least 0.3 dl/g.

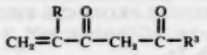
4,011,201
POLYMERS OF MONOMERS CONTAINING ACTIVE METHYLENE GROUPS AND OTHER ETHYLENICALLY UNSATURATED MONOMERS

Ignazio S. Ponticello, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 497,803, Aug. 15, 1974, Pat. No. 3,939,130. This application Nov. 13, 1975, Ser. No. 631,801
Int. Cl.² C08F *28/00*; C08G *75/00*
U.S. Cl. 260—65 **11 Claims**

1. A polymer comprising

A. from about 1 to 100% by weight of a polymerized monomer containing at least one active methylene group and having the formula



wherein R is hydrogen or methyl, and R^3 is alkoxy containing from 1 to 10 carbon atoms or amino having the structure atoms;

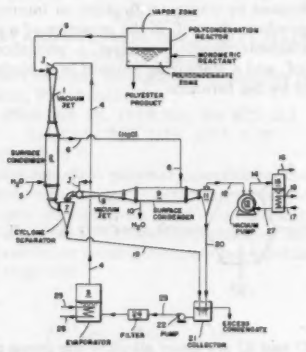
wherein R_4 and R_5 are independently selected from the group consisting of hydrogen, alkyl having 1 to 10 carbon atoms and aryl containing from 6 to 12 carbon atoms and

B. from 0 to about 99% by weight of at least one additional polymerized ethylenically unsaturated monomer.

4,011,202
SEPARATING VAPOROUS REACTION PRODUCT IN THE PRODUCTION OF POLYESTERS

Karl Ebner, Oberursel; Franz Ettinger, Kassel; Rudolf Fuchs, Fuldabruck, and Helmut Schnorr, Kassel, all of Germany, assignors to Akzona Incorporated, Asheville, N.C.

Filed Feb. 27, 1975, Ser. No. 553,681
Claims priority, application Germany, Feb. 27, 1974, 2409343
Int. Cl.² C08G *63/22*
U.S. Cl. 260—75 M **10 Claims**



1. In a process for the separation of vaporous reaction products from the vapor zone of a polycondensation reactor in which a polyester is produced, said vaporous reaction products being drawn off by the suction of a fluid vacuum jet, the improvement which comprises:

supplying glycol vapor as the jet medium to suction off said vaporous reaction products through at least a first stage vacuum jet;

condensing at least part of the glycol vapor emerging from the vacuum jet; and

subsequently separating non-condensable gases and residual condensable vapors from each other by suction withdrawal through a liquid circulating vacuum pump operated by liquid glycol in a closed liquid circuit.

4,011,203
AROMATIC POLYAMIDE FROM PIPERAZINE, p-PHENYLENE DIAMINE AND TEREPHTHALOYL HALIDE

Tuyoshi Konomi; Keiji Yukimatsu; Kenichi Katsuo, and Masayasu Yamaguchi, all of Otsu, Japan, assignors to Toyobo Co., Ltd., Osaka, Japan

Filed Dec. 19, 1974, Ser. No. 534,475

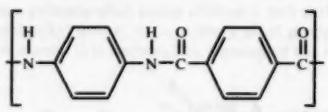
Claims priority, application Japan, Dec. 19, 1973, 48-143099

Int. Cl.² C08G *69/32*

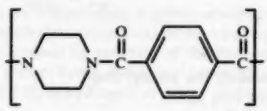
U.S. Cl. 260—78 R **10 Claims**

1. A fiber-forming or filmforming aromatic polyamide consisting essentially of repeating units of the following formulae [I] and [II]:

[I]



[II]



wherein the repeating units of the formula [II] are contained in said polyamide in the ratio of 10 to 35 molar % of the whole polymer, said polyamide being produced by polycondensing a mixed diamine consisting of piperazine and p-phenylenediamine with a substantially equimolar amount of terephthaloyl dihalide in at least one amide type polar solvent, said piperazine being employed in the ratio of 10 to 35 molar % on the basis of the whole diamine component.

4,011,204
QUATERNARY SALTS OF METHACRYLIC OR ACRYLIC ESTERS AND CATIONIC QUATERNAY POLYELECTROLYTES AND ION EXCHANGE RESINS THEREOF

Milan Beneš, and Jan Peška, both of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Nov. 1, 1972, Ser. No. 302,897

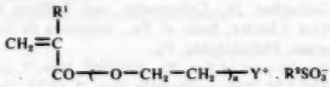
Claims priority, application Czechoslovakia, Nov. 2, 1971, 7687/71; Nov. 2, 1971, 7688/71

Int. Cl.² C08F *3/84, 7/12, 15/02*

U.S. Cl. 260—79.3 MU **13 Claims**

1. Homopolymers comprising the monomer of the general formula I

I



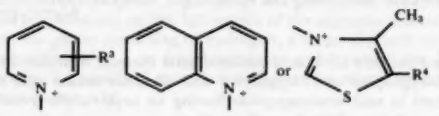
wherein

R^1 is H or CH_3

R^2 is CH_3, C_6H_5 or p-$CH_3C_6H_4$

n is 1 or 2 and

Y^+ is



where

R^3 is H, CH_3, $CONH_2$, CHO, $COCH_3$ and

R^4 is H or CH_2CH_2OH.

4,011,205
ENZYME SEPARATION

Peter Duncan Goodearl Dean, 43 Redgate, Formby, Lancashire, and Christopher Robin Lowe, 'Fairlight', 238 Windsor Road, Maidenhead, Berkshire, both of England

Division of Ser. No. 469,221, May 13, 1974, abandoned, which is a continuation of Ser. No. 224,528, Feb. 8, 1972, abandoned. This application Sept. 2, 1975, Ser. No. 609,418

Claims priority, application United Kingdom, Feb. 11, 1971, 3469/71

Int. Cl.² C07G *7/00*

U.S. Cl. 260—112 R **9 Claims**

1. A reactive matrix consisting essentially of a reduced form of nicotinamide adenine dinucleotide chemically attached to a water insoluble organic polymeric support material, said reactive matrix being free from chemically attached enzymes, and said water insoluble organic polymeric support material containing said reduced form of nicotinamide adenine dinucleotide attached thereto being capable of attracting enzymes in affinity chromatography which are attracted to said reduced form of nicotinamide adenine dinucleotide, thereby making it possible to separate enzymes from other components of a liquid medium containing said enzymes as well as other enzymes.

4,011,206
EXTRACTION OF A SWEET SUBSTANCE FROM *THAUMATOCOCCUS DANIELLII* FRUIT

John Douglas Higginbotham, near Reading, England, assignor to Tate & Lyle Limited, London, England

Filed Apr. 28, 1976, Ser. No. 681,258

Claims priority, application United Kingdom, Apr. 29, 1975, 17831/75; Feb. 13, 1976, 5719/76

Int. Cl.² A23J *1/00*; A23L *1/22*; C07G *7/00*

U.S. Cl. 260—112 R **22 Claims**

1. A process for the extraction of a sweet substance from the fruit of *Thaumatococcus daniellii* which comprises extracting at least a portion of the fruit with a dilute aqueous solution of an aluminum salt.

4,011,207
DES-(ALA¹, GLY², LYS⁴-SRIF, DES-(ALA¹, GLY², LYS⁴)-D-TRP⁸-SRIF AND INTERMEDIATES

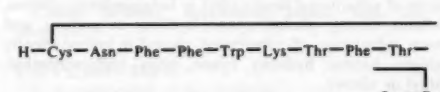
Dimitrios Surantakis, West Chester, Pa., assignor to American Home Products Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 537,037, Dec. 27, 1974, abandoned. This application Mar. 8, 1976, Ser. No. 664,608

Int. Cl.² C07C *103/52*; A61K *37/00*

U.S. Cl. 260—112.5 S **8 Claims**

1. A undecapeptide selected from those of the formula



-continued

H—Cys—Asn—Phe—Phe—Trp—Lys—Thr—Phe—Thr—
Ser—Cys—OH

and the non-toxic acid addition salts thereof, in which Trp is L-tryptophyl or D-tryptophyl and all other amino acid residues in said undecapeptide having an asymmetric α-carbon atom being of the L-configuration.

4,011,208
3-CYANO OR ACYL-4-ARYL-5-ARYLAZO-6-HYDROXYPYRIDONE-2 DYES

Hermann Burkhard, Neu-Allschwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

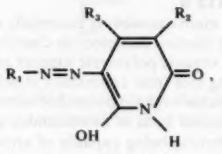
Continuation-in-part of Ser. No. 148,162, May 28, 1971, abandoned, which is a continuation of Ser. No. 787,585, Dec. 27, 1968, abandoned. This application Sept. 11, 1974, Ser. No. 504,876

Claims priority, application Switzerland, Jan. 18, 1968, 787/68

Int. Cl.² C09B *29/36*; D06P *3/26, 3/36, 3/54*

U.S. Cl. 260—156 **15 Claims**

1. A compound of the formula



wherein

R_1 is phenyl, substituted phenyl, naphthyl or substituted naphthyl, wherein each substituent of substituted phenyl and substituted naphthyl Is independently chloro, bromo, hydroxy, cyano, nitro, trifluoromethyl, alkyl, substituted alkyl, alkoxy, substituted alkoxy, acyl, acyloxy, acylamino, formyl, morpholinosulfonyl, piperidinosulfonyl, morpholinosulfonyloxy, aziridinoslfonyloxy, peripidinoslfonyloxy, alkylsulfamoylamilino, phenylsulfamoylanilino, dinitroanilino, alkylcarbonylaminophenyl, dinitrophenyl, phenylazo, nitrophenylazo, dichlorophenylazo, bromophenylazo, cyanophenylazo, methoxyphenylazo, ethoxyphenylazo, tolylazo or acylphenylazo, wherein each substituent of substituted alkyl and substituted alkoxy is independently chloro, bromo, alkoxy, phenyl, cyano, hydroxy or acyloxy,

R_2 is cyano, acyl, thienylcarbonyl or pyridylcarbonyl, and

R_3 is phenyl, naphthyl, thiazolyl, benzothiazolyl, thienyl, pyrrolyl, furyl, pyridyl, imidazolyl or benzimidazolyl, or a substituted derivative thereof, wherein each substituent is independently chloro, bromo, alkyl, substituted alkyl, alkoxy, substituted alkoxy, hydroxy, trifluoromethyl, cyano, thiocyano, nitro, alkylamino, dialkylamino, acyl, acyloxy or acylamino,

wherein each substituent of substituted alkyl and substituted alkoxy is independently chloro, bromo, alkoxy, phenyl, cyano, hydroxy or acyloxy,

wherein each acyl and acyl radical of each acyloxy, acylamino and acylphenylazo is independently R—X— or R′—Y′,

wherein R is lower alkyl, substituted lower alkyl, cyclohexyl, phenyl or substituted phenyl, wherein each substituent of substituted lower alkyl is independently chloro, bromo, alkoxy, phenyl, cyano, hydroxy or acyloxy, and each substituent of substituted phenyl is independently chloro, bromo, hydroxy, cyano, nitro, trifluoromethyl, alkyl or alkoxy,

X is —CO—, —O—CO— or —SO_2—,

R′ is hydrogen or R, and

Y is —NR′—CO— or —NR′—SO_2—, and

each alkyl, alkoxy and alkyl and alkoxy radical of each substituted alkyl, substituted alkoxy, alkylsulfamoylanilino, alkylcarbonylaminophenyl, alkylamino and dialkylamino independently has 1 to 10 carbon atoms.

4,011,209
ORGANIC SOLVENT-SOLUBLE AZO DYES

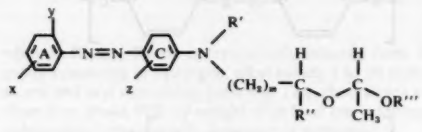
Francesco De Feo; Sisto Papa, both of Milan, and Enrico Traverso, Monza (Milan), all of Italy, assignors to Aziende Colori Nazionali Affini ACNA S.p.A., Milan, Italy

Continuation of Ser. No. 153,868, June 16, 1971, abandoned. This application Mar. 5, 1973, Ser. No. 337,821

Int. Cl.² C09B *43/00*

U.S. Cl. 260—207.5 **6 Claims**

1. An organic solvent-soluble azo dye having the formula



in which

A and C each represents the phenyl ring;

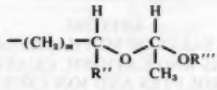
m is an integer from 1 to 3;

x represents H or a NO_2 group;

y represents H, Cl, NO_2 or alkyl or alkoxy containing from 1 to 3 carbon atoms;

z represents H, Cl, or alkyl or alkoxy containing from 1 to 3 carbon atoms;

R′ represents alkyl containing from 1 to 3 carbon atoms; or R′ represents the group



R″ represents H or alkyl containing from 1 to 3 carbon atoms; and

R‴ represents alkyl containing from 1 to 18 carbon atoms.

4,011,210
4-SULFANILAMIDOTHIAZOLE

Gregory Gallagher, Jr., Collegeville, and William D. Kingsbury, West Chester, both of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 521,707, Nov. 7, 1974, Pat. No. 3,939,172. This application Nov. 7, 1975, Ser. No. 629,837

Int. Cl.² C07D *277/52*

U.S. Cl. 260—239.95 **1 Claim**

1. 4-Sulfanilamidothiazole.

4,011,211
STEROID TOTAL SYNTHESIS PROCESS UTILIZING ASYMMETRIC INDUCTION

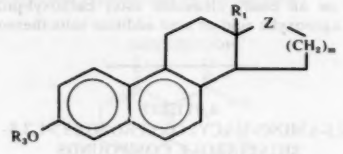
Noal Cohen, Montclair, and Gabriel Saucy, Essex Fells, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 406,980, Oct. 16, 1973, Pat. No. 3,932,519, which is a division of Ser. No. 100,372, Dec. 21, 1970, abandoned. This application Sept. 24, 1975, Ser. No. 616,239

Int. Cl.² C07J 17/00

U.S. Cl. 260—239.55 R **1 Claim**

1. A process for the preparation of compounds of the formula

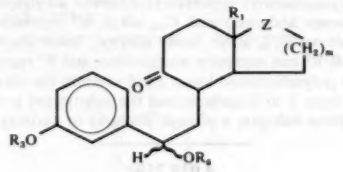


where

R_1 is a primary alkyl group of from 1 to 5 carbon atoms; R_3 is a cycloalkyl group, or a primary alkyl group from 1 to 8 carbon atoms; Z is carbonyl or a group of the formula

where R_7 is hydrogen, a group consisting of the residue of a hydrocarbyl monocarboxylic acid having from 1 to 18 carbon atoms formed by removal of the hydroxyl portion of the carboxyl group, lower alkyl, aryl lower alkyl or tetrahydropyran-2-yl and R_8 is hydrogen or lower aliphatic hydrocarbyl; and *m* is 1 or 2;

which comprises reacting a compound of the formula



where

R_1, R_3, Z and *m* are as above; and R_6 is hydrogen, lower acyl or aroyl;

with a strong acid.

4,011,212
22-CYANO-24-NORCHOLANES

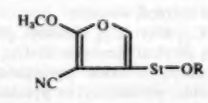
Nedumparambil A. Abraham, Dollard des Ormeaux, and Yvon Lefebvre, Pierrefonds, both of Canada, assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 469,269, May 13, 1974, Pat. No. 3,944,541. This application Dec. 15, 1975, Ser. No. 641,128

Int. Cl.² C07J 17/00

U.S. Cl. 260—239.55 R **4 Claims**

1. A compound of general formula



in which St represents rings A. B, C and D of naturally occurring 3β-oxygenated aglycones with their respective substituents attached thereto selected from the group consisting of digitoxigenin, periplogenin, digoxigenin and gitoxigenin, R represents a substituent on the 3β-oxygen of the aglycone selected from the group consisting of hydrogen, a lower aliphatic acyl group containing 2 to 4 carbon atoms and in which the 2-methoxy-3-cyanofuryl group is attached to the steroid moiety St at position 17β.

4,011,213
ALKYL 4-[O-(SUBSTITUTED METHYLENEAMINO)PHENYL]-3-THIOALLOPHANATES

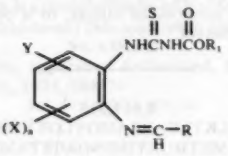
Joel Benjamin Wommack, Jr., Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 865,947, Oct. 13, 1969, Pat. No. 3,836,569. This application May 24, 1974, Ser. No. 473,157

Int. Cl.² C07C 149/40

U.S. Cl. 260—240 G **8 Claims**

1. A compound of the formula



wherein

X is hydrogen, fluorine, chlorine, or bromine;

Y is hydrogen or alkyl of 1 to 4 carbon atoms;

R_1 is alkyl of 1 to 12 carbon artoms;

R is thienyl; furyl; naphthyl; pryidyl; quinolyl; alkyl of 1 to 12 carbon atoms; alkoxy of 1 to 3 carbon atoms or

R_2 is hydrogen or alkyl of 1 to 4 carbon atoms;

R_3 is alkyl of 1 to 4 carbon atoms, provided that R_2 and R_3 can be taken together to be $-CH_2CH_2OCH_2CH_2-$ or $-(CH_2)_m-$;

when Y is alkyl *n* is O;

when Y is hydrogen *n* is 1, 2 or 3;

m is 4, 5 or 6;

and the sodium, potassium, lithium, calcium, barium, copper, zinc and manganese salts of these compounds.

4,011,214
3-(MORPHOLINOALKOXYIMINOMETHYL)CEPHEM COMPOUNDS

Shinji Terao; Mitsuru Shiraishi, both of Osaka; Toshio Miyawaki, Hyogo; Isao Minamida, Kyoto; Masayoshi Yamaoka, and Mitsuo Numata, both of Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Japan

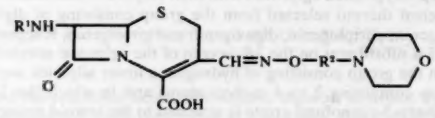
Filed Dec. 20, 1974, Ser. No. 534,787

Claims priority, application Japan, Dec. 20, 1973, 48-143175

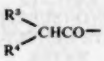
Int. Cl.² C07D 501/50, 501/52, 501/54

U.S. Cl. 260—240 G **23 Claims**

1. A compound of the formula:



wherein R^1 is formyl, benzoyl or a group having the formula:



wherein R^3 is hydrogen, phenyl, phenoxy, thienyl, tetrazolyl, furyl, pyrazolyl, pyridyloxy, cyclohexenyl, acetyl, cyano, 3-amino-3-carboxypropyl or 3-amino-3-carboxypropyl in which the 3-amino group is protected with isobornyloxycarbonyl, β-methylsulfonylethoxycarbonyl, benzoyl, phathalyl, p-t-butylbenzoyl, phenylacetyl, phenylthiocarbonyl, benzyloxycarbonyl, p-toluenesulfonyl, or p-t-butylbenzenesulfonyl, and R^4 is hydrogen, hydroxyl, sulfo, carboxyl or C_{1-5} alkyl, and R^2 is unsubstituted C_{1-4} alkylene or substituted C_{1-4} alkylene substituted with methoxy or ethoxy, or a pharmaceutically acceptable salt thereof.

4,011,215

3-CHLOROALKYLCARBAMOYLOXYMETHYL-7-[2-(FUR-2-YL)-2-METHOXYIMINOACETAMIDO]CEPH-3-EM-4-CARBOXYLIC ACIDS AND PHYSIOLOGICALLY ACCEPTABLE SALTS OR OXIDES THEREOF

Martin C. Cook, Liverpool; Gordon I. Gregory, Chalfont St. Peter, and Janice Bradshaw, Harrow, all of England, assignors to Glaxo Laboratories Limited, Greenford, England

Filed Aug. 1, 1975, Ser. No. 601,397

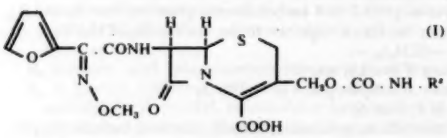
Claims priority, application United Kingdom, Aug. 15, 1974, 36012/74

The portion of the term of this patent subsequent to Aug. 10, 1993, has been disclaimed.

Int. Cl.² C07D *501/20*

U.S. Cl. 260—243 C **6 Claims**

1. A compound selected from the group consisting of a cephalosporin antibiotic of the formula



(I)

wherein R^2 represents a C_1–C_4 alkyl group substituted by chlorine, and a physiologically acceptable salt or oxide thereof.

4,011,216

Δ²·³-0-2-ISOCEPHEM-4-CARBOXYLIC ACID AND DERIVATIVES THEREOF AS ANTIBACTERIAL AGENTS

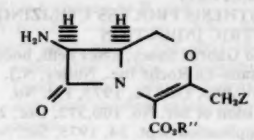
Marcel Menard; Gary M. F. Lim, both of Candiac, and Terry T. Conway, Brossard, all of Canada, assignors to Bristol-Myers Company, New York, N.Y.

Filed Apr. 11, 1975, Ser. No. 567,323

Int. Cl.² C07D *265/00, 273/00, 295/00;* **A01N** *9/00*

U.S. Cl. 260—244 R **13 Claims**

1. A compound of the formula



wherein Z is esterified hydroxyl of the formula

$$-OCOR_2$$

wherein R_2 is hydrogen, amino or (lower)alkyl and R'' is hydrogen or an easily cleavable ester carboxyl-protecting group, or carboxylic acid or acid addition salts thereof.

4,011,217

4-(3-AMINO-2-ACYLOXYPROPOXY)-1,2,5-THIADIAZOLE COMPOUNDS

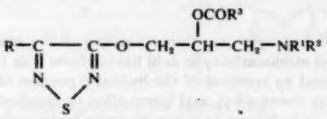
Burton Kendall Wasson, Valois, Canada, assignor to Merck Sharp & Dohme (I.A.) Corporation, Rahway, N.J.

Division of Ser. No. 352,765, April 19, 1973, Pat. No. 3,891,639. This application Feb. 26, 1975, Ser. No. 553,186

Int. Cl.² C07D *285/10, 295/12*

U.S. Cl. 260—247.1 H **2 Claims**

1. A racemic product or an optically active isomer thereof having the structure



or an acid addition salt thereof wherein R represents hydrogen, chloro, lower alkyl, lower alkoxy, phenyl, benzyl, N-lower alkylcarbamoyl, piperazinyl, N-lower alkylpiperazinyl; R^1 represents hydrogen and C_{1-5} alkyl; R^2 represents C_{1-10} alkyl, hydroxy C_{1-10} alkyl, lower alkenyl, lower alkynyl; the radical NR^1R^2 can represent morpholino; and R^3 represents a mono- or polysubstituted lower alkyl wherein the alkyl group contains from 2 to 6 carbons and the substituent groups are selected from halogen, a phenyl, phenoxy or carboxy.

4,011,218

1,2,4-TRIAZOLES

John J. Baldwin, Lansdale, and Frederick C. Novello, Berwyn, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 269,684, July 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 75,785, Sept. 25, 1970, abandoned. This application Dec. 3, 1974, Ser. No. 529,151

Int. Cl.² C07D *249/08*

U.S. Cl. 260—250 AH **9 Claims**

1. A compound of the formula:

and non-toxic salts thereof, wherein

R_1 is hydrogen, C_{1-5} alkyl, C_{2-5} alkanoyl, phenyl -C_{1-5} alkyl, carbamoyl C_{1-5} alkylcarbamoyl or di -C_{1-5} alkylcarbamoyl;

R_3 is pyridylmethyl, N-oxide pyridylmethyl, pyrazinyl, pyrazinyl-N-oxide, pyridazinyl or pyridazinyl-N-oxide; and

R_5 is pyridyl, pyridyl-N-oxide, pyrazinyl or pyrazinyl-N-oxide such that when R_5 is a pyridyl, R_3 is other than a pyridyl.

4,011,219

PHTHALAZINE DERIVATIVES AND SALTS THEREOF

Yasuho Nishii; Shun-ichi Hata; Kiyoshige Wakabayashi; Koji Mizuno, Tokyo; Akio Yoshida, and Minoru Shindo, all of Tokyo, Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 28, 1975, Ser. No. 562,920

Int. Cl.² C07D *237/32*

U.S. Cl. 260—250 P **3 Claims**

1. A compound represented by the formula

wherein R represents an alkylene having 1-6 carbon atoms, or a salt thereof.

4,011,220

PYRIDAZINIUM COMPOUNDS AND A PROCESS FOR THEIR PRODUCTION

Rudolf Kropp, Limburgerhof; Franz Reicheneder; August Amann, both of Ludwigshafen, and Hubert Giertz, Limburgerhof, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

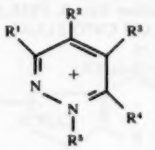
Division of Ser. No. 396,615, Sept. 12, 1973, Pat. No. 3,980,633. This application Mar. 8, 1976, Ser. No. 664,645

Claims priority, application Germany, Sept. 15, 1972, 2245248

Int. Cl.² C07D *237/20*

U.S. Cl. 260—250 A **3 Claims**

1. A pyridazinium compound of the formula:



in which

R^1 is hydrogen;

R^2 is amino;

R^3 is hydrogen;

R^4 is hydrogen or $-SR^6$ in which R^6 is an alkyl of one to 12 carbon atoms;

R^5 is phenyl; and

$Y^{\ominus}$ is a pharmaceutically acceptable anion of an inorganic or organic acid selected from the group consisting of perchloric acid, hydrochloric acid, hydrobromic acid, hydroiodic acid, phosphoric acid, carbonic acid, sulfuric acid, methylsulfuric acid, ethylsulfuric acid, trifluoromethylsulfonic acid, nitric acid or fluoboric acid, formic acid, acetic acid, trifluoroacetic acid, propionic acid, glycolic acid, lactic acid, pyruvic acid, oxalic acid, malonic acid, succinic acid, maleic acid, fumaric acid, malic acid, tartaric acid, citric acid, ascorbic acid, benzoic acid, phenylacetic acid, 4-amino-benzoic acid, 4-hydroxybenzoic acid, anthranilic acid, cinnamic acid, mandelic acid, salicylic acid, 4-aminosalicylic acid, 2-acetoxysalicylic acid, p-toluenesulfonic acid, isonicotinic acid, nicotinic acid, methionine, tryptophan, lysine and arginine.

4,011,221

S-INOSYLCYSTEINE AND A PROCESS FOR PRODUCING THE SAME

Eiichi Sakakibara, Takarazuka; Iwao Hashimoto, Osaka, and Mitsuru Hirohashi, Katano, all of Japan, assignors to Funai Pharmaceutical Industries, Ltd., Japan

Filed Aug. 21, 1975, Ser. No. 606,478

Claims priority, application Japan, Aug. 22, 1974, 49-95527

Int. Cl.² C07D *473/30*

U.S. Cl. 260—252 **1 Claim**

1. S-inosylcysteine.

4,011,222

FLUORO-SUBSTITUTED DIBENZO[b,f]THIEPINS

Max Gerecke, Reinach; Jean-Pierre Kaplan, Le Plessis Robinson, and Emilio Kyburz, Reinach, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

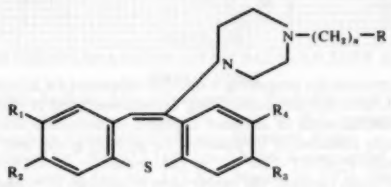
Division of Ser. No. 471,101, May 17, 1974, Pat. No. 3,966,737, which is a continuation-in-part of Ser. No. 378,733, July 12, 1973, abandoned. This application Jan. 12, 1976, Ser. No. 648,345

Claims priority, application Switzerland, Mar. 30, 1973, 4606/73; Jan. 16, 1974, 568/74

Int. Cl.² C07D *409/04*

U.S. Cl. 260—268 TR **5 Claims**

1. A compound of the formula



wherein *n* is an integer from 1 to 3; R is hydrogen or, when *n* is 2 or 3, is hydroxy or an alkanoyloxy group of 2–18 carbon atoms; one of R_1 and R_2 is hydrogen and the other is methyl, methoxy, methylthio, dimethylsulfamoyl, fluoro, chloro or trifluoromethyl; and one of R_3 and R_4 is hydrogen, and the other is methyl, methoxy, methylthio, dimethylsulfamoyl, fluoro, chloro or trifluoromethyl, provided that at least one of R_1, R_2, R_3 and R_4 is fluoro, or a pharmaceutically acceptable acid addition salt thereof.

4,011,223

BIS-(1,4-BETA-AMINO CARBONYL-ETHYL)-PIPERAZINES

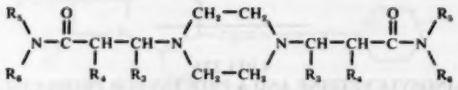
David Charles Priest, Charlotte, N.C.; Michael Ray Sandner, Charleston, and David John Trecker, South Charleston, both of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 463,247, April 23, 1974, Pat. No. 3,954,749, which is a division of Ser. No. 309,906, Nov. 27, 1972, Pat. No. 3,821,131. This application Feb. 23, 1976, Ser. No. 660,000

Int. Cl.² C07D *295/12*

U.S. Cl. 260—268 R **3 Claims**

2. N,N′-piperazino-bis[3-(N″,N″-dialkylamides)] having the formula,



wherein R_3 and R_4 are hydrogen or alkyl having from 1 to 4 carbon atoms, and R_5 and R_6 are alkyl having from 1 to 4 carbon atoms.

4,011,224

PROCESS FOR THE PREPARATION OF 7-OXO-7H-DIBENZO-[d e, h]-QUINOLIN-2-OL

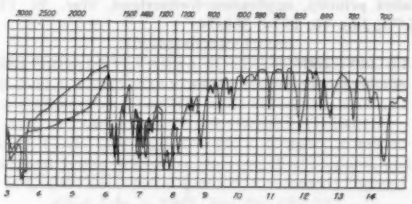
Francesco De Feo, Milan; Franco Gonzati, Saronno (Varese), and Alberto Osti, Milan, all of Italy, assignors to Aziende Colori Nazionali Affini ACNA S.p.A., Milan, Italy

Filed Dec. 26, 1974, Ser. No. 536,591

Claims priority, application Italy, Jan. 21, 1974, 19614/74; July 16, 1974, 25196/74

Int. Cl.² C09B 5/14

U.S. Cl. 260—278 **16 Claims**



1. A process for preparing 7-oxo-7H-dibenzo-[d e,h]-quinolin-2-ol, said process comprising cycloisomerizing N-phenylacetyl-phthalimide in an inert aliphatic or aromatic solvent, optionally substituted by chlorine or an NO_2 group and at a temperature of 50°–200° C. in the presence of $AlCl_3$ as a Friedel-Craft catalyst, the molar ratio of catalyst to N-phenylacetyl-phthalimide being 2–5:1 to form an intermediate which is o-(3-hydroxy-1-isoquinolinyl)-benzoic acid and thereafter subjecting the intermediate to dehydrating condensation to cyclize same and form 7-oxo-7H-dibenzo-[d e,h]-quinolin-2-ol.

4,011,225

8-CYANO-5,6,7,8-TETRAHYDROQUINOLINE DERIVATIVES

Adrian Charles Ward Curran, South Cave; Roger Crossley, Reading, and David George Hill, Cookham, all of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

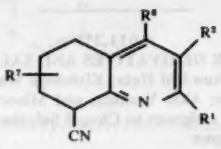
Continuation-in-part of Ser. No. 600,257, July 30, 1975, abandoned, which is a continuation-in-part of Ser. No. 460,265, April 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 403,289, Oct. 3, 1973, abandoned. This application Oct. 20, 1975, Ser. No. 624,081

Claims priority, application United Kingdom, Oct. 21, 1972, 48595/72; Oct. 15, 1973, 7424/73; July 21, 1973, 34866/73; Aug. 16, 1973, 38701/73; Oct. 17, 1973, 48595/72

Int. Cl.² C07D 215/48

U.S. Cl. 260—283 CN **8 Claims**

1. A compound of formula IA



and acid addition salts thereof with pharmaceutically acceptable acids, wherein R^1, R^2 and R^6 are the same or different and are selected from hydrogen, trifluoromethyl, alkyl having from 1 to 6 carbon atoms, phenylalkyl wherein the alkyl group has 1 - 6 carbon atoms, or phenyl groups or R^1 and R^2 taken together represent a polymethylene chain of 3 to 5 carbon atoms, R^7 represents hydrogen or from 1 to 3 groups selected from alkyl of 1 to 6 carbon atoms (which may be substituted by alkoxy of 1 to 6 carbon atoms or trifluoromethyl), phenylalkyl wherein the alkyl group has 1 to 6 carbon atoms and phenyl groups, and any of the phenyl or the phenyl portion of any phenylalkyl groups R^1, R^2, R^6 and R^7 may be substituted by alkyl of 1 to 6 carbon atoms, lower alkoxy of 1 to 6 carbon atoms, halogen, nitro or trifluoromethyl with the provisos that (1)when R^1 and R^2 or R^2 and R^6 are both alkyl they are selected from normal and secondary alkyl groups and (2) when two alkyl R^7 groups are present on the same carbon atom then they are both n-alkyl groups and when two R^7 alkyl groups are present on adjacent carbon atoms they are selected from normal and secondary alkyl groups.

4,011,226

8-CARBOXYL-TETRAHYDROQUINOLINE DERIVATIVES

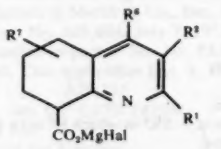
Adrian Charles Ward Curran, Newcastle-upon-Tyne, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

Division of Ser. No. 526,353, Nov. 22, 1974, Pat. No. 3,963,722. This application Dec. 8, 1975, Ser. No. 638,383

Int. Cl.² C07D 215/48

U.S. Cl. 260—287 T **5 Claims**

1. A compound of formula (II)



wherein

R^1, R^2 and R^6 are independently hydrogen or alkyl or 1 to 6 carbon atoms or one of R^1, R^2 and R^6 is trifluoromethyl, phenylalkyl or 7 to 12 carbon atoms, phenyl, alkylphenyl of 7 to 12 carbon atoms, alkoxyphenyl of 7 to 12 carbon atoms, halophenyl, nitrophenyl or trifluoromethylphenyl;

R^7 is hydrogen, alkyl or 1 to 6 carbon atoms, gem dimethyl (at the 5, 6 or 7 position), phenylalkyl of 7 to 12 carbon atoms;

and

Hal represents chlorine, bromine or iodine; with the proviso that when R^1 and R^2 or R^2 and R^6 are both alkyl, they are selected from normal and secondary alkyl groups.

4,011,227
o-(3-HYDROXY-1-ISOQUINOLINYL)-BENZOIC ACID

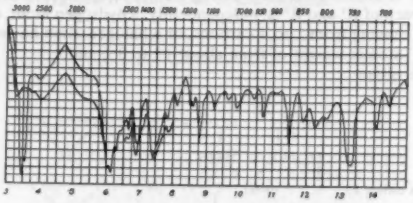
Francesco De Feo, Milan; Franco Gonzati, Saronno (Varese), and Alberto Osti, Milan, all of Italy, assignors to Aziende Colori Nazionali Affini ACNA S.p.A., Milan, Italy

Division of Ser. No. 536,591, Dec. 26, 1974. This application Apr. 23, 1976, Ser. No. 679,559

Claims priority, application Italy, Jan. 21, 1974, 19614/74; July 16, 1974, 25196/74

Int. Cl.² C07D *217/24*

U.S. Cl. 260—287 D 1 Claim



1. o-(3-hydroxy-1-isoquinolinyl)-benzoic acid.

4,011,228
CARBOXYLIC ACID SALTS OF TETRAHYDROQUINOLINES AND PYRIDINE DERIVATIVES

Adrian Charles Ward Curran, Newcastle-upon-Tyne, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

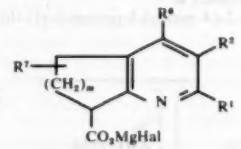
Division of Ser. No. 526,353, Nov. 22, 1974, Pat. No. 3,963,722. This application Dec. 8, 1975, Ser. No. 638,739

Claims priority, application United Kingdom, Nov. 26, 1973, 54728/73; Mar. 27, 1974, 13516/74

Int. Cl.² C07D *215/48*, *221/04*

U.S. Cl. 260—287 T 9 Claims

1. A compound of formula (II):



wherein

R^1, R^2 and R^6 are independently hydrogen or alkyl of 1 to 6 carbon atoms, or one of R^1, R^2 and R^6 is trifluoromethyl, phenylalkyl of 7 to 12 carbon atoms, phenyl, alkylphenyl of 7 to 12 carbon atoms, alkoxyphenyl of 7 to 12 carbon atoms, halophenyl, nitrophenyl or trifluoromethylphenyl; or R^1 and R^2, taken together, are trimethylene, tetramethylene or pentamethylene or an R^7 substituted derivative thereof;

R^7 is hydrogen, alkyl of 1 to 6 carbon atoms, gem-dimethyl, phenylalkyl of 7 to 12 carbon atoms, phenyl, alkylphenyl of 7 to 12 carbon atoms, alkoxyphenyl of 7 to 12 carbon atoms, halophenyl, nitrophenyl and trifluoromethylphenyl;

m is 1 or 3;

and

Hal represents chlorine, bromine or iodine, with the proviso that when R^1 and R^2 or R^2 and R^6 are both alkyl, they are selected from normal and secondary alkyl groups.

4,011,229
8-AMINO-5,6,7,8-TETRAHYDROQUINOLINE DERIVATIVES

Adrian Charles Ward Curran, South Cave; Roger Crossley, Reading, and David George Hill, Cookham, all of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

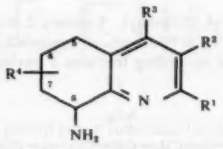
Continuation-in-part of Ser. No. 554,259, Feb. 28, 1975, Pat. No. 3,991,065. This application Apr. 2, 1976, Ser. No. 673,016

Claims priority, application United Kingdom, Mar. 5, 1974, 9763/74

Int. Cl.² C07D *215/40*

U.S. Cl. 260—288 R 4 Claims

1. A compound of formula I



(I)

and pharmaceutically acceptable acid addition salts thereof, wherein R^1, R^2 and R^3 are the same or different and represent hydrogen, or lower alkyl of 1–6 carbon atoms, R^4 represents hydrogen or substitution at the 5,6 or 7-position by lower alkyl of 1–6 carbon atoms, with the proviso that when any two of R^1, R^2 and R^3 are lower alkyl and are on adjacent carbon atoms then they are selected from normal and secondary alkyl groups.

4,011,230
DITHIOCARBAMATE ESTER BACTERICIDES AND FUNGICIDES

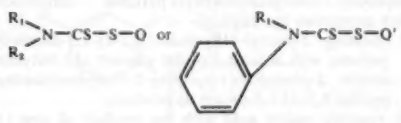
Thomas Andrew Lies, Montgomery Township, and James Wellington Clapp, Princeton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 323,169, Jan. 12, 1973, abandoned, which is a division of Ser. No. 127,825, March 24, 1971, Pat. No. 3,723,494. This application Apr. 14, 1975, Ser. No. 567,664

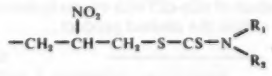
Int. Cl.² C07D *401/12*, *403/12*

U.S. Cl. 260—293.85 7 Claims

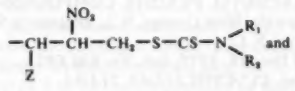
1. A compound having the structure:



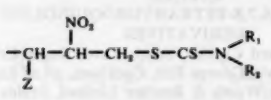
wherein Q represents



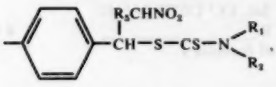
or



wherein Q′ represents

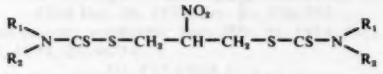


and where R_1 and R_2 are each loweralkyl C_1–C_4, or when R_1 and R_2 are taken together with N represent a piperidine or pyrrolidine nucleus; and Z is phenyl,



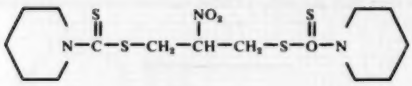
1-naphthyl, 2-furyl, 2-thienyl, 5-chloro-2-thienyl or substituted phenyl and R_3 is hydrogen or lower alkyl C_1–C_4.

2. A compound according to claim **1** having the formula:



where R_1 and R_2 are each loweralkyl C_1–C_4, or when R_1 and R_2 are taken together with N form piperidine or pyrrolidine.

5. A compound according to claim **2:**



4,011,231

2-PHENYL-6-(1-HYDROXY-2-t-BUTYLAMINOETHYL)-4H-PYRIDO[3,2-d]-1,3-DIOXIN MALEATE AND ITS USE AS AN INTERMEDIATE

Ronnie D. Carroll, East Lyme; Bernard S. Moore, Waterford, and James R. Tretter, Niantic, all of Conn., assignors to Pfizer Inc., New York, N.Y.

Filed Oct. 3, 1975, Ser. No. 619,302

Int. Cl.² C07D *213/69*

U.S. Cl. 260—296 R **1 Claim**

1. A process for producing 2-hydroxymethyl-3-hydroxy-6-(1-hydroxy-2-t-butylaminoethyl)-pyridine dihydrochloride which comprises the steps of

1. heating 2-phenyl-4H-pyrido-[3,2-d]-1,3-dioxin-6-epoxyethane with at least a molar amount of t-butylamine to obtain 2-phenyl-6-(1-hydroxy-2-t-butylaminoethyl)-4H-pyrido[3,2-d]-1,3-dioxin as product,
2. reacting maleic acid with the product of step (1) in a molar ratio of at least 1:1 in ethyl acetate at a temperature of from 30° to 50° C. to obtain 2-phenyl-6-(1-hydroxy-2-butylaminoethyl)-4H-pyrido[3,2-d]-1,3-dioxin maleate as product and
3. treating the product of step (2) with excess hydrochloride in methanol to obtain the desired product.

4,011,232

PHENOXYPHENYL PYRIDYL COMPOUNDS

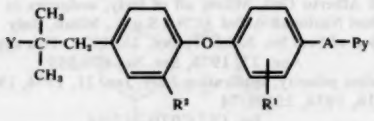
Faizulla G. Kathawala, West Orange, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed Dec. 18, 1975, Ser. No. 635,681

Int. Cl.² C07D *213/44*, *213/50*

U.S. Cl. 260—297 R **18 Claims**

1. A compound which is a free base of the formula:

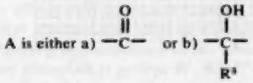


wherein

Y is unbranched alkyl having from 1 to 3 carbon atoms,

each of R^1 and R^2 is, independently, a hydrogen atom, alkyl having from 1 to 4 carbons, or a halogen atom having an atomic weight of from about 19 to 35; and

A is either



wherein

R^3 is a hydrogen atom or alkyl having from 1 to 4 carbon atoms; and

Py is a pyridyl radical which may be attached at its 2-, 3-, or 4-position; or

a pharmaceutically-acceptable acid addition salt thereof.

4,011,233

2-METHYL-2-(4-METHYL-3-PENTENE-1-YL) THIAZOLIDINE

Paul Dubs, Zug; Heiner Küntzel, Oberengstringen; Mario Pesaro, Zurich, and Harald Schmidt, Walliseilen, all of Switzerland, assignors to Givaudan Corporation, Cliftcn, N.J.

Division of Ser. No. 374,714, June 28, 1973, Pat. No. 3,944,561. This application Aug. 22, 1975, Ser. No. 606,808

Int. Cl.² C07D *277/04*

U.S. Cl. 260—306.7 R **1 Claim**

1, 2-Methyl-2-(4-methyl-3-penten-1-yl)-thiazolidine.

4,011,234

N-ALKANOYL OXAZOLE-CARBOXAMIDE COMPOUNDS

Hans Hoffmann-Paquotte, Inzlingen, Germany, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

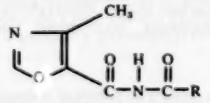
Filed June 25, 1976, Ser. No. 699,907

Claims priority, application Switzerland, July 11, 1975, 9102/75

Int. Cl.² C07D *263/34*

U.S. Cl. 260—307 R **4 Claims**

1. A compound of the formula:



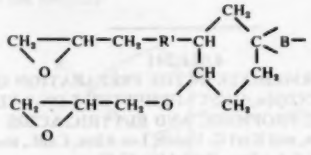
wherein R is lower alkyl.

4,011,235
POLYGLYCIDYL COMPOUNDS CONTAINING N-HETEROCYCLIC STRUCTURE

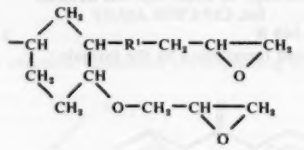
Jürgen Habermeier, Pfeffingen; Hans Batzer, Arlesheim, and Daniel Porret, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 371,449, June 19, 1973, Pat. No. 3,900,493. This application July 7, 1975, Ser. No. 593,801
Claims priority, application Switzerland, June 23, 1972, 9528/72
Int. Cl.² C07D *233/72*
U.S. Cl. 260—309.5 **1 Claim**

1. A polyglycidyl compound of the formula



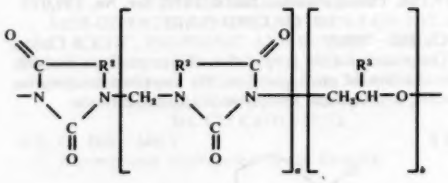
(I)



wherein B denotes the radical

R^1 denotes a divalent radical of the formula

(II)

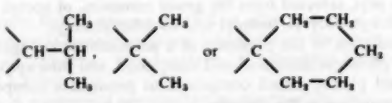


wherein

a and *b* are identical or different and denote either 0 or 1;

R^3 is hydrogen or methyl;

and R^2 denotes one of the radicals

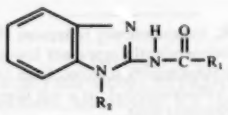


4,011,236
N-(BENZIMIDAZOL-2-YL)ARYLCARBOXAMIDES AS ULTRAVIOLET (UV) LIGHT ABSORBERS

Nathaniel Grier, Englewood, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 320,231, Jan. 2, 1973, Pat. No. 3,907,700, which is a continuation-in-part of Ser. No. 758,601, Sept. 9, 1968, abandoned. This application May 27, 1975, Ser. No. 580,847
Int. Cl.² C07D *235/30*
U.S. Cl. 260—309.2 **1 Claim**

1. A N-(benzimidazol-2-yl)arylcarboxamide having the formula:



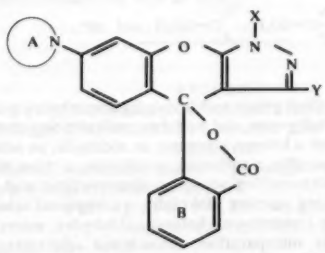
wherein R_1 is a phenyl group substituted at the 2-, 3- or 4-position by a member selected from the group consisting of methoxycarbonyl, ethoxycarbonyl, butoxycarbonyl, propoxycarbonyl, dodecyloxycarbonyl, carboxy, phenyl, nitro, and carboxamide and R_2 is a member selected from the group consisting of hydrogen, methyl, acetyl, methoxycarbonyl, butyryl, pivaloyl, stearoyl, acryl, toluyl, mesitoyl, butyl, octyl, benzoyl, halobenzoyl, and phenyl.

4,011,237
HETEROCYCLIC SUBSTITUTED CHROMENOPYRAZOLES

Jean Claude Petitpierre, Kaiseraugst, Switzerland, and Robert Garner, Bury, England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 24, 1975, Ser. No. 625,731
Claims priority, application Switzerland, Nov. 13, 1974, 15130/74
Int. Cl.² C07D *491/02*
U.S. Cl. 260—310 R **7 Claims**

1. A chromenopyrazole of the formula



(I)

wherein

the ring A represents pyrrolidinyl,

X and Y, independently of the other, represent alkyl of 1 to 12 carbon atoms, alkoxy of 1 to 12 carbon atoms, phenyl or phenyl which is substituted by alkyl of 1 to 4 carbon atoms, nitro, halogen, amino or by an amino group which is mono- or disubstituted by alkyl of 1 to 12 carbon atoms acyl of 2 to 12 carbon atoms or by benzyl, and

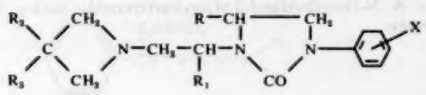
wherein the benzene ring B is unsubstituted or is substituted by a nitro group or by 1 to 4 halogen atoms.

4,011,238
2-IMIDAZOLIDIONE DERIVATIVES

Luigi Fontanella, and Guilio Maffii, both of Milan, Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

Continuation of Ser. No. 367,675, June 6, 1973, abandoned. This application July 7, 1975, Ser. No. 593,358
Claims priority, application Italy, July 26, 1972, 27404/72
Int. Cl.² C07D *403/06*
U.S. Cl. 260—309.7 3 Claims

1. A compound represented by the formula



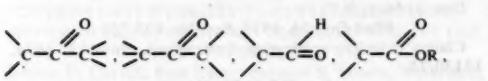
wherein R and R_1 independently represent H or lower alkyl, and R_2 and R_3 independently represent lower alkyl, X represents one or two substituents selected from lower alkyl, halo, lower alkoxy or trifluoromethyl, or a salt thereof with a pharmaceutically-acceptable acid.

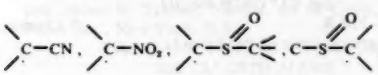
4,011,239
SELECTIVE REACTIONS OF FREE RADICALS WITH OLEFINS IN THE PRESENCE OF AN ION OF Mn, V, OR Ce

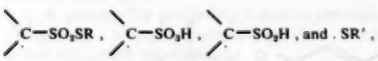
El Ahmadi I. Heiba, Princeton, and Ralph M. Dessau, Highland Park, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 755,732, Aug. 27, 1968, abandoned, and a continuation-in-part of Ser. No. 714,447, March 20, 1968, abandoned. This application Sept. 24, 1973, Ser. No. 400,484
Int. Cl.² C07D *327/04*; C07C *69/52*, *45/02*
U.S. Cl. 260—327 S 58 Claims

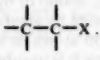
1. Method of selectively reacting a free radical X with an olefin, said free radical X being selected from the group consisting of







Where R is an alkyl group and R′ is a hydrocarbyl or substituted hydrocarbyl group, and said free radical being derived respectively from a ketone, a ketone, an aldehyde, an ester, a nitrile, a nitroparaffin, a sulfoxide, a sulfoxide, a thiosulfonic acid ester, an alkanesulfonic acid, an alkanesulfinic acid, and a thiol, comprising reacting said olefin, a compound selected from the group consisting of ketones, aldehydes, esters, nitriles, sulfoxides, nitroparaffins, thiosulfonic acid esters, alkanesulfonic acids, allkanesulfinic acids, and thiols, and a stoichiometric quantity of an ion of manganese, vanadium, or cerium having a valence higher than the lowest valence above the zero valent form of the metal to form a product containing the structure



4,011,240
SUBSTITUTED CYSTEINES

Roland-Yves Mauvernay, Riom; Andre Monteil, Gerzat; Jacques Simond, Chamalieres; Jacques Moleyre, Mozac, and Norbert Busch, Loubeyrat, all of France, assignors to Centre Europeen de Recherches Mauvernay (CERM), Riom, France

Filed Oct. 12, 1972, Ser. No. 296,902
Claims priority, application France, Oct. 13, 1971, 71.36840
Int. Cl.³ C07D *333/16*
U.S. Cl. 260—332.2 A 3 Claims

1. N-acetyl-S-(3-paramethoxyphenyl-3-oxo) propylcysteine.

2. N-acetyl-S-(3-thien-2-yl-3-oxo) propylcysteine.

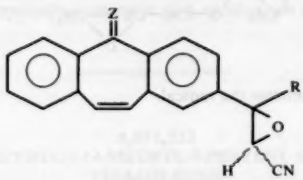
3. N-acetyl-S-(3-paramethoxyphenyl-3-oxo-2-methyl) propylcysteine.

4,011,241
AN INTERMEDIATE IN THE PREPARATION OF 2-(5H-DIBENZO[a,d]CYCLOPHEPTEN-5-ON-2-YL)ACETIC, PROPIONIC AND BUTYRIC ACIDS

Peter H. Nelson, and Karl G. Untch, Los Altos, Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Sept. 8, 1975, Ser. No. 611,053
Int. Cl.² C07D *303/02*
U.S. Cl. 260—348 R 2 Claims

1. A compound represented by the formula



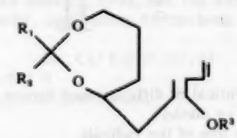
wherein R is hydrogen, methyl or ethyl and Z is oxo.

4,011,242
PROSTAGLANDIN INTERMEDIATES AND PROCESSES FOR PREPARATION OF PROSTAGLANDIN INTERMEDIATES

Lawrence Libit, 240 E. O'Keefe St., Palo Alto, Calif.

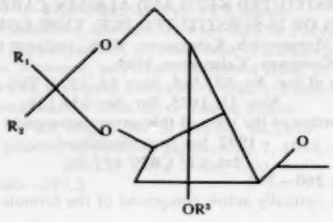
Division of Ser. No. 230,939, March 1, 1972, Pat. No. 3,859,188. This application Jan. 6, 1975, Ser. No. 539,027
Int. Cl.² C07D *319/08*
U.S. Cl. 260—340.3 6 Claims

1. The process for the preparation of intermediates useful in the production of prostaglandins, the steps which comprise subjecting a compound corresponding to the formula

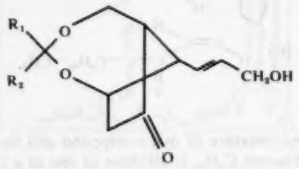


where R_1 and R_2 are the same or different alkyl, cycloalkyl or aralkyl groups containing up to 8 carbon atoms, and R^3 is acyl, selected from the group consisting of acetyl, propionyl, butyryl, benzoyl and cyclohexylacetyl,

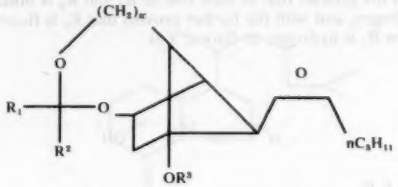
to irradiation in the presence of a photosensitizing agent to effect photocyclization of said compound, and then epoxidizing said photocyclized compound to produce a compound corresponding to the formula



2. The process of claim 1, in which the epoxidized compound is then cleaved to produce a keto-alcohol corresponding to the formula



3. A chemical compound corresponding to the formula



where R_1 and R_2 are the same or different alkyl or cycloalkyl or aralkyl groups containing up to 8 carbon atoms, R^3 is a member selected from the group consisting of acetyl, propionyl, butyryl, benzoyl and cyclonexylacetyl and w is an integer from 1 to 10.

4,011,243

INTERMEDIATE IN THE OXIDATIVE PROCESS FOR THE PREPARATION OF 2-(5H-DIBENZO[a,d]CYCLOHEPTEN-5-ON-2-YL)ACETIC, PROPIONIC AND BUTYRIC ACIDS

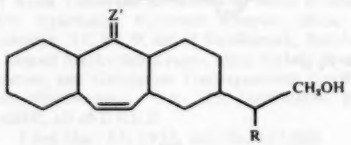
Peter H. Nelson, and Karl G. Untch, both of Los Altos, Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Sept. 8, 1975, Ser. No. 611,054

Int. Cl.² C07D *317/72*

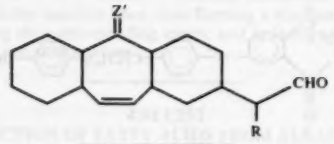
U.S. Cl. 260—340.9 **4 Claims**

1. A compound represented by the formula



wherein R is hydrogen, methyl or ethyl and Z′ is a conventional ketal protecting group selected from the group consisting of ethylene, 1,3-propylene, 2,2-dimethyl-1,3-propylene and 2,3-butylene.

3. A compound represented by the formula



wherein R is hydrogen, methyl or ethyl and Z′ is a conventional ketal protecting group selected from the group consisting of ethylene, 1,3-propylene, 2,2-dimethyl-1,3-propylene and 2,3-butylene.

4,011,244

PROCESS FOR PREPARING TETRAHYDROFURAN

William Edward Smith, Schenectady, N.Y., assignor to General Electric Company, Pittsfield, Mass.

Continuation-in-part of Ser. No. 420,851, Dec. 3, 1973, abandoned. This application Oct. 20, 1975, Ser. No. 623,904

Int. Cl.² C07D *307/08*

U.S. Cl. 260—346.1 R **2 Claims**

1. A process for preparing tetrahydrofuran which comprises heating a carboxylic acid monoester of 1,4-butanediol in the vapor phase in the presence of a dehydroacyloxylation catalyst selected from the group consisting of alumina, silica, silica-alumina, and silica-magnesia under substantially anhydrous conditions at a temperature in the range of from 200° C to about 325° C.

4,011,245

METHOD FOR THE MANUFACTURE OF 2,6,10,10-TETRAMETHYL-1-OXASPIRO 4,5-DEC-6-ENE

Peter Naegeli, Wettingen, Switzerland, assignor to Givaudan Corporation, Clifton, N.J.

Filed Mar. 5, 1976, Ser. No. 664,212

Claims priority, application Switzerland, Mar. 11, 1975, 3053/75; Dec. 30, 1975, 16871/75

Int. Cl.² C07D *307/94*

U.S. Cl. 260—346.1 R **5 Claims**

1. A process for the manufacture of theaspiran, which process comprises treating 4-(2,6,6-trimethyl-2-cyclohexen-1-ylidene)-butan-2-ol with an acid.

4,011,246

2-[4-(3,4-DICARBOXYPHENOXY)PHENYL]-2-(4-HYDROXYPHENYL)PROPANE AND THE ANHYDRIDES THEREOF

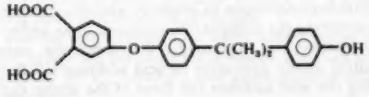
Ronald L. Markezich, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 14, 1976, Ser. No. 676,855

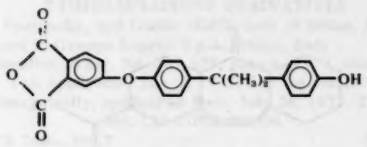
Int. Cl.² C07D *307/89*

U.S. Cl. 260—346.3 **3 Claims**

1. A bisphenol-A compound selected from the class consisting of a compound having the formula



and a compound having the formula



4,011,247
METHOD FOR THE PREPARATION OF AN ORGANOHYDROGENPOLYSILOXANE AS A PRODUCT OF A PARTIAL ADDITION REACTION

Yasuhiko Sato; Hiroshi Inomata, and Toshio Shiobara, all of Annaka, Japan, assignors to Shinetsu Chemical Company, Tokyo, Japan

Filed Oct. 4, 1974, Ser. No. 512,369
Claims priority, application Japan, Oct. 8, 1973, 48-113047
Int. Cl.² C07D *301/00*
U.S. Cl. 260—348 SC **6 Claims**

1. A method for the preparation of an organohydrogenpolysiloxane comprising the steps of:

A. partial addition reaction between

a. a cyclic or non-cyclic organic unsaturated compound with an aliphatic double bond in the molecule selected from the group consisting of ethylene, propylene, cyclohexene, styrene, α-methylstyrene, methyl acrylate, ethyl acrylate, methyl methacrylate, ethyl methacrylate, allyl acetate, allyl acrylate, allyl methacrylate, allyl glycidyl ether, vinyl cyclohexene monoepoxide and 4-vinyl styreneoxide, and

b. starting organohydrogenpolysiloxane represented by the average formula

$$(R)_a(H)_bSiO_{(4-a-b)/2}$$

where R is methyl or phenyl, a and b are each positive numbers expressed as $1 \leqq a \leqq 2$ and $b \leqq 1$, respectively, with the proviso that $2 \leqq (a+b) \leqq 3$, and having at least two hydrogen atoms directly bonded to the silicon atoms through Si—H linkages in one molecule, in an amount such that the amount of said hydrogen atoms in said starting organohydrogenpolysiloxane is in excess over equimolar to said aliphatic double bond, in the presence of a platinum catalyst, by which part of said Si—H linkages are subjected to addition reaction with said aliphatic double bonds and the remaining of said Si—H linkages are left unreacted,

B. addition of a compound selected from the group consisting of benzothiazole, 2,2'-dithiobisbenzothiazole, 2-(morpholinothio)benzothiazole, and 2-(morpholinodithio) benzothiazole to the reaction mixture obtained by said partial addition reaction in an amount larger than equimolar to said platinum catalyst, and

C. recovery of an organohydrogenpolysiloxane as the finished product by distillation.

4,011,248
ORGANIC COMPOUNDS

Istvan Toth, Bottmingen, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Filed Dec. 1, 1975, Ser. No. 636,816
Claims priority, application Switzerland, Dec. 5, 1974, 16158/74
Int. Cl.² C09B *1/00*
U.S. Cl. 260—369 **11 Claims**

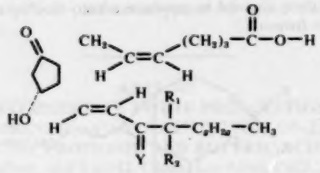
1. A process of purifying 1-nitroanthraquinone in admixture with dinitroanthraquinone as impurity which comprises selectively converting the dinitroanthraquinone to an amino derivative by treatment of the mixture with ammonia, converting the resulting amino derivative to acid addition salt form, and separating the acid addition salt form of the amino derivative from the 1-nitroanthraquinone on the basis of their different polarities.

4,011,249
SUBSTITUTED KETO AND ALKOXY CARBONYL ESTERS OF 16-SUBSTITUTED PGE_2 TYPE COMPOUNDS

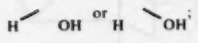
Walter Morozowich, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 523,568, Nov. 14, 1974. This application Nov. 21, 1975, Ser. No. 634,124
The portion of the term of this patent subsequent to July 8, 1992, has been disclaimed.
Int. Cl.² C07C *177/00*
U.S. Cl. 260—390 **11 Claims**

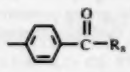
1. An optically active compound of the formula



or a racemic mixture of that compound and the enantiomer thereof. Wherein C_gH_{2g} is alkylene of one to g carbon atoms inclusive, with one to 5 carbon atoms inclusive, in the chain between $—CR_1R_2—$ and (terminal methyl: R_1 and R_2 are hydrogen, methyl, ethyl, or fluoro, being the same or different, with the proviso that at least one of R_1 and R_2 is other than hydrogen, and with the further proviso that R_2 is fluoro only when R_1 is hydrogen or fluoro; Y is

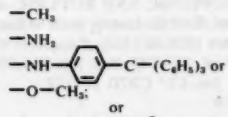


and E is

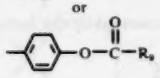


(1)

wherein R_8 is



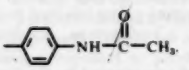
or



(2)

wherein R_9 is

or

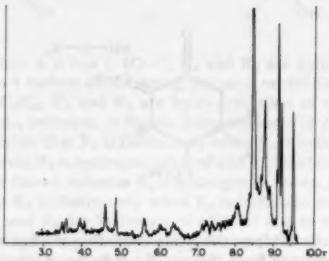


4,011,250

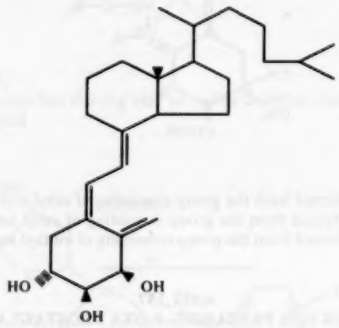
1α, 2α-DIHYDROXYCHOLECALCIFEROL AND PROCESS FOR PREPARING THE SAME

Masayuki Ishikawa; Chikara Kaneko, both of Tokyo; Satoshi Sasaki, Higashiyamato; Tatsuo Suda, Tachikawa; Sachiko Yamada, Kawagoe, and Akiko Sugimoto, Hino, all of Japan, assignors to Masayuki Ishikawa; Chikara Kaneko; Satoshi Sasaki and Tatsuo Suda, all of Tokyo, Japan

Filed Aug. 6, 1975, Ser. No. 602,363
Claims priority, application Japan, Aug. 7, 1974, 49-89835
Int. Cl.² C07J 71/00, 9/00
U.S. Cl. 260—397.2 1 Claim



1. 1α,2α-dihydroxycholecalciferol represented by the formula



4,011,251

METHOD OF PREPARING ESTERS OF GLYCEROL AND POLYGLYCEROLS AND C5–C9 MONOCARBOXYLIC FATTY ACIDS

Boris Konstantinovich Tjurin, prospekt Oktyabrya, 71, kv. 116; Appolon Lukich Momot, prospekt Lenina, 26, kv. 2; Nikolai Lvovich Volodin, ulitsa Revoljutsionnaya, 7, kv. 12; Valentina Trofimovna Peremitina, prospekt Oktyabrya, 27, kv. 53; Anna Vasilievna Evdokimova, ulitsa Druzhby, 68, kv. 109; Vyacheslav Petrovich Churov, ulitsa Zheleznodorozhnaya, 14, kv. 9, all of Sterlitamak, Bashkirskaya ASSR; Samuil Markovich Krugly, ulitsa Khlobystova, 6, kv. 14, Moscow, and Gabdulbar Garifzyanovich Garifzyanov, ulitsa Revoljutsionnaya, 7, kv. 25, Sterlitamak, Bashkirskaya ASSR, all of U.S.S.R.

Filed Mar. 13, 1975, Ser. No. 557,948
Int. Cl.² C09F 5/08; C11C 3/00
U.S. Cl. 260—410.6 3 Claims

1. Method of producing esters of glycerol and polyglycerols with C_5–C_9 monocarboxylic fatty acids which comprises reacting the still residue resulting from the distillation of synthetic glycerol produced by a chlorine method and containing in said residue glycerol, polyglycerols, sodium hydroxide and sodium chloride with C_5–C_9 monocarboxylic fatty acids at a temperature of 140° – 210° C with continuous distillation of water present in the reaction zone, thus forming a reaction mixture containing the corresponding esters, and isolating said esters from the reaction mixture.

4,011,252

PRODUCTION OF FATTY ACIDS FROM ALKANES BY OXIDATION

Harold Robert Gerberich, Jr., and Edward F. Dougherty, both of Corpus Christi, Tex., assignors to Celanese Corporation, New York, N.Y.

Filed Aug. 20, 1975, Ser. No. 606,280
Int. Cl.² C07C 51/20, 51/24, 51/26, 51/28
U.S. Cl. 260—413 9 Claims

1. A process for the production of fatty acids which comprises:

a. oxidation of C_{30} to C_{20} normal alkanes with molecular oxygen at elevated temperatures and at pressures sufficient to maintain a liquid phase of said alkanes so as to produce an alkane oxidation product containing fatty acids, unreacted alkanes, and oxygenated hydrocarbon intermediates, said alkane oxidation product being comprised of an aqueous phase containing most of the C_1 to C_6 fatty acids and a hydrocarbon phase containing most of the C_7 and higher fatty acids;

b. hydrogenation of at least the said hydrocarbon phase of said alkane oxidation product by reacting same with molecular hydrogen under hydrogenation conditions utilizing a catalytic amount of a hydrogenation catalyst, the hydrogenation being carried to an extent sufficient to reduce the degree of unsaturation by at least 50% as measured by the iodine number in the material being hydrogenated but insufficient to substantially affect the fatty acids contained therein;

c. oxidation by nitric acid oxidation of the product obtained in such hydrogenation so as to oxidize oxygenated hydrocarbon intermediates therein to fatty acids and produce a nitric acid oxidation product comprised of an aqueous phase containing most of the C_1 to C_6 fatty acids and a hydrocarbon phase containing most of the C_7 and higher fatty acids, said nitric acid oxidation being conducted at elevated temperatures and pressures sufficient to maintain a liquid phase and in the presence of a catalytic amount of a nitric acid oxidation catalyst; and

d. recovery of a fatty acid product from said nitric acid oxidation product.

4,011,253

PROCESS FOR THE PRODUCTION OF SILICIC ACRYLATE COMPOUNDS AND RESINOUS PRODUCTS

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Continuation-in-part of Ser. No. 589,626, June 23, 1975, abandoned, and Ser. No. 551,534, Feb. 21, 1975, Pat. No. 3,956,466. This application July 9, 1976, Ser. No. 703,925
Int. Cl.² C07F 7/08, 7/18
U.S. Cl. 260—448.2 E 9 Claims

1. The process for the production of silicic acrylate compounds and resinous products by the following steps:

(a) adding about 100 parts by weight of dry granular alkali metal metasilicate slowly to 50 parts by weight of concentrated sulfuric acid (60–98% acid)

(b) agitating said mixture to keep the temperature below 100° C and oxygen evolves from the mixture, thereby

(c) producing a white granular mixture of a silicic acid compound and alkali metal sulfate;

(d) washing said mixture with water, then filtering the mixture to remove the alkali metal sulfate and then air drying at 25° to 75° C., leaving a fine white granular silicic acid compound;

(e) mixing about 50 parts by weight of said silicic acid

compound with about 30 to 95 parts by weight of an acrylic acid compound;

(f) adding an alkali catalyst in the ratio of 1% to 10% by weight of the silicic acid compound and acrylic acid compound;

(g) heating the said mixture to just below the boiling point of the acrylic acid compound while agitating for about 20 to 60 minutes, thereby

(h) producing a tan granular silicic acrylate compound.

4,011,254
PROCESS FOR THE PURIFICATION OF DIAMINOMALEONITRILE

Tatsumi Kobayashi; Yutaka Takakura; Sadafumi Yoshino, and Yoshiaki Fukuda, all of Kurashiki, Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan

Filed Aug. 19, 1975, Ser. No. 605,865

Claims priority, application Japan, Sept. 3, 1974, 49-101228

Int. Cl.² C07C *120/00, 121/45*

U.S. Cl. 260—465.5 R **7 Claims**

1. A process for the recovery of diaminomaleonitrile, in essentially pure form, from a crude mixture produced by the tetramerization of hydrogen cyanide and containing (a) diaminomaleonitrile, (b) a higher hydrogen cyanide polymer than the tetrameric diaminomaleonitrile which is soluble in a solvent for diaminomaleonitrile, and (c) a higher hydrogen cyanide polymer than tetrameric diaminomaleonitrile which is insoluble in a solvent for diaminomaleonitrile, comprising heating said crude mixture in a gaseous medium which is inert towards diaminomaleonitrile and is selected from the group consisting of air and nitrogen, at a temperature of about from 90° C to 140° C for about from 0.5 to 5 hours whereby said higher hydrogen cyanide polymer which is soluble in a diaminomaleonitrile solvent is converted to additional higher hydrogen cyanide polymer which is insoluble in a diaminomaleonitrile solvent, separating the diaminomaleonitrile from the insoluble higher polymer by extraction with a diaminomaleonitrile solvent, and removing the solvent from the resulting diaminomaleonitrile solution to obtain diaminomaleonitrile in a purity of about 99%.

4,011,255
FLUOROALKYLENEETHER DIFUNCTIONAL COMPOUNDS

Christ Tamborski, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sept. 4, 1975, Ser. No. 610,520

Int. Cl.² C07C *121/28*

U.S. Cl. 260—465.6 **3 Claims**

1. A fluoroalkyleneether difunctional compound having the following formula:

$$NC-R_f-CN,$$

wherein R_f is $Y[CF(CF_3)CF_2O]_n(CF_2)_4[OCF_2CF(CF_3)]_nY$, wherein each Y is $(CF_2)_4O$ or $CF(CF_3)OCF_2CF_2O$ and the carbon atom of each CN radical is bonded to a carbon atom, and wherein n is an integer from 1 to 5, inclusive.

4,011,256
CYCLOHEXANE DERIVATIVES

Mikio Sawaki, Odawara; Isao Iwataki, Odawara; Yoshihiko Hirono, Hiratsuka, and Hisao Ishikawa, Odawara, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan

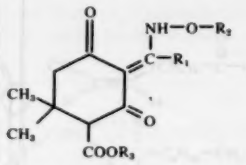
Division of Ser. No. 490,349, July 22, 1974, Pat. No. 3,950,420. This application Oct. 9, 1975, Ser. No. 620,862

Claims priority, application Japan, Aug. 15, 1973, 48-91425; Mar. 7, 1974, 49-25714

Int. Cl.² C07C *101/42*

U.S. Cl. 260—468 J **4 Claims**

1. A compound of the formula



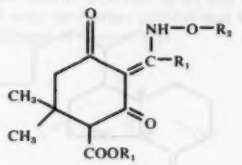
wherein

R_1 is selected from the group consisting of ethyl and propyl,

R_2 is selected from the group consisting of ethyl and allyl,

R_3 is selected from the group consisting of methyl and ethyl.

3. The sodium, potassium, barium and calcium salts of a compound of the formula



wherein

R_1 is selected from the group consisting of ethyl and propyl,

R_2 is selected from the group consisting of ethyl and allyl,

R_3 is selected from the group consisting of methyl and ethyl.

4,011,257
PROCESS FOR PREPARING 5-OXA PROSTAGLANDIN ANALOGS

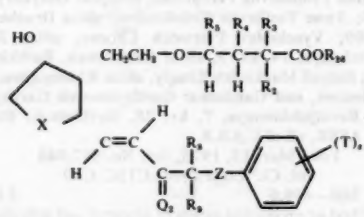
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 524,481, Nov. 18, 1974, abandoned, which is a division of Ser. No. 361,990, May 21, 1973, Pat. No. 3,864,387. This application Feb. 26, 1976, Ser. No. 661,573

Int. Cl.² C07C *69/76*

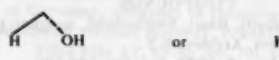
U.S. Cl. 260—473 G **12 Claims**

1. A process for preparing an optically active compound of the formula

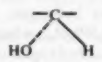


or a racemic compound of that formula and the mirror image thereof, wherein Z represents an oxa atom (—O—) or C_2H_2

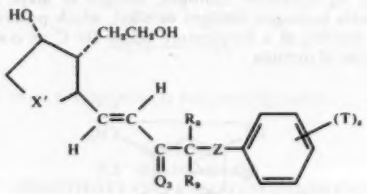
wherein C_jH_{2j} is a valence bond or alkylene of one to 9 carbon atoms, inclusive, substituted with zero, one, or 2 fluoro, with one to 6 carbon atoms, inclusive between $-CR_8R_9-$ and the ring; wherein T is alkyl of one to 4 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or $-OR_{10}$, wherein R_{10} is hydrogen or alkyl of one to 4 carbon atoms, inclusive, and s is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl and when s is 2 or 3 the T's are either the same or different; wherein Q_2 is



wherein, when Z is oxa (—O—), R_8 and R_9 are hydrogen or alkyl of 1 to 4 carbon atoms, being the same or different, and, when Z is C_jH_{2j}, R_8 and R_9 are hydrogen, alkyl of one to 4 carbon atoms, inclusive, or fluoro, being the same or different, with the proviso that R_9 is fluoro only when R_8 is hydrogen or fluoro; wherein R_3 is hydrogen, alkyl of one to 4 carbon atoms, inclusive, or fluoro; wherein R_2 is hydrogen or fluoro, with the proviso that R_2 is fluoro only when R_3 is hydrogen or fluoro; wherein R_4 and R_5 are hydrogen or alkyl of one to 4 carbon atoms, inclusive, being the same or different, with the proviso that no more than one of R_3, R_4, and R_5 is alkyl; and wherein R_{26} is alkyl of one to 3 carbon atoms, inclusive; and wherein X is



or $-CH_2-$;
which comprises starting with an optically active compound of the formula

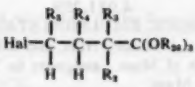


or a racemic compound of that formula and the mirror image thereof, wherein Q_2 is

wherein R_{13} is a blocking group, wherein X' is

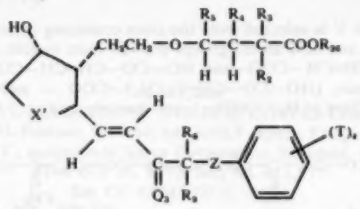
or $-CH_2-$,
and wherein R_8, R_9, Z, T, and s are as defined above; and subjecting said compound successively to the following reactions:

a. alkylation with an omega-halo ortho ester of the formula



wherein Hal is chloro, bromo, or iodo, and wherein R_2, R_3, R_4, R_5 and R_{26} are as defined above, in the presence of a base, with the proviso that, when the base is an organolithium compound, there is present either hexamethylphosphoramide or dimethyl formamide;

b. transformation of the product of step a) to an optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein Q_2, R_2, R_3, R_4, R_5, R_8, R_9, R_{13}, R_{26}, S, T, X', and Z are as as defined above, by hydrolysis; and

c. replacement of the blocking groups with hydrogen, by hydrolysis.

4,011,258

ORALLY ACTIVE BRONCHOSPASMOLYTIC COMPOUNDS

Kjell Ingvar Leopold Wetterlin, Sandby, and Leif Ake Svensson, Lund, both of Sweden, assignors to Aktiebolaget Draco, Lund, Sweden

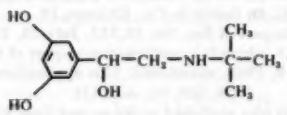
Division of Ser. No. 372,497, June 21, 1973, Pat. No. 3,937,838, which is a continuation-in-part of Ser. No. 55,791, July 17, 1970, and Ser. No. 55,676, July 17, 1970, said Ser. No. 55,791, said Ser. No. 55,676, each is a continuation-in-part of Ser. No. 676,288, Oct. 18, 1967, abandoned. This application July 7, 1975, Ser. No. 593,424

Int. Cl.² C07C *93/26, 91/34*

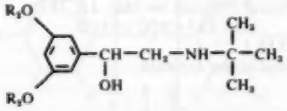
U.S. Cl. 260—479 R **3 Claims**

1. A compound effective for producing bronchial dilation in animals, including humans, selected from the group consisting of

i. ethanol amines having the formulas



and



wherein R_4 is the acyl radical of a 2-5 carbon fatty acid and

ii. pharmaceutically acceptable salts thereof.

4,011,259
MONOMERIC EMULSION STABILIZERS

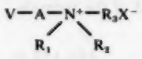
Carlos M. Samour, Wellesley Hills, and Mildred C. Richards, Wakefield, both of Mass., assignors to The Kendall Company, Walpole, Mass.

Division of Ser. No. 496,321, Aug. 9, 1974, Pat. No. 3,928,423, which is a division of Ser. No. 272,282, July 17, 1972, abandoned, which is a division of Ser. No. 867,899, Oct. 20, 1969, Pat. No. 3,780,092. This application July 11, 1975, Ser. No. 595,296

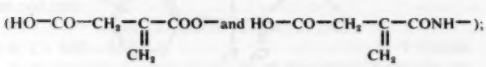
Int. Cl.² C07C *93/00, 103/70*

U.S. Cl. 260—485 H 2 Claims

1. Compound corresponding to the formula

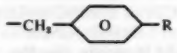


wherein V is selected from the class consisting of acid ester groups and acid amido groups derived from maleic, (HO—CO—CH=CH—COO—and HO—CO—CH=CH—CONH—), citraconic, (HO—CO—CH=C(CH_3)—COO — and HO—CO—CH=C(CH_3)CONH—), and itaconic acids

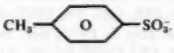


A is selected from the class consisting of ethylene (—CH_2—CH_2—); propylene (—CH_2—CH_2—CH_2—); isopropylene (—CH_2—$CH(CH_3)$—); hydroxypropylene (—CH_2—$CHOH$-CH_2—); and acetoxypropylene (—CH_2—$CH(OCOCH_3)$—CH_2—) groups;

R_1 and R_2 are selected from the class consisting of benzyl groups and alkyl groups of from 1 to 7 carbon atoms; R_3 is a



group wherein R is a saturated aliphatic hydrocarbon group of 7 to 28 carbon atoms; and X is a radical selected from the class consisting of F^-, Cl^-, Br^-, I^-, $CH_3SO_4^-$, $C_2H_5SO_4^-$, and



4,011,260
3-AMINO-N-SUBSTITUTED SUCCINAMIC ACIDS AND INTERMEDIATES THERETO

Arthur H. Goldkamp, Bellevue, Wash.; Robert H. Mazur, Deerfield, and James M. Schlatter, Glenview, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

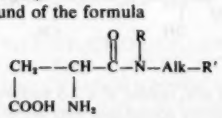
Continuation-in-part of Ser. No. 56,753, July 20, 1970, Pat. No. 3,803,223, which is a continuation-in-part of Ser. No. 704,229, Feb. 9, 1968, abandoned. This application Feb. 14, 1974, Ser. No. 442,431

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C07C *103/50*

U.S. Cl. 260—514 J 5 Claims

1. A compound of the formula



wherein R is hydrogen or a methyl radical, Alk is a lower alkylene radical and R′ is a cyclohexyl radical.

4,011,261
PROCESS FOR THE MANUFACTURE OF 1,4-DISUBSTITUTED BICYCLIC OR TRICYCLIC COMPOUNDS AND NEW 1,4-DISUBSTITUTED BICYCLIC COMPOUNDS

Leonardo Guglielmetti, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

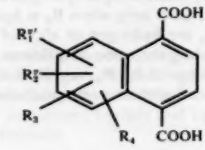
Filed Nov. 5, 1975, Ser. No. 629,180

Claims priority, application Switzerland, Nov. 14, 1974, 15190/74

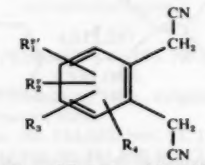
Int. Cl.² C07C *51/08, 63/38*

U.S. Cl. 260—515 P 7 Claims

1. A process for the manufacture of bicyclic or tricyclic compounds of formula



wherein $R_1^{v'}$ represents hydrogen, halogen, alkyl, alkoxy, carboxy, sulpho, $-SO_2NR_5R_6$, wherein each of R_5 and R_6 independently represents hydrogen or alkyl, or together they complete a 5- or 6-membered heterocyclic ring, alkylsulphonyl, arylsulphonyl, nitro, or together with R_2^v completes a 6-membered aromatic ring or represents the methylenedioxy radical, R_2^v represents hydrogen, halogen, alkyl, alkoxy, carboxy, alkylsulphonyl, nitro, or together with $R_1^{v'}$ completes a 6-membered aromatic ring or represents the methylenedioxy radical, R_3 represents hydrogen, halogen or alkyl, and R_4 represents hydrogen, halogen or alkyl, which process comprises reacting at a temperature below 50° C an o-xylylene dicyanide of formula



wherein $R_1^{v'}$, R_2^v, R_3 and R_4 are as defined hereinbefore, with glyoxal in the presence of a base and a solvent, and saponifying the resultant reaction product, without isolating it, with an acid or a base, at temperatures above 50° C.

4,011,262
13,14-DIHYDRO-15-SUBSTITUTED-ω-PENTANORPROSTAGLANDINS OF THE TWO SERIES

Hans-Jurgen E. Hess, Old Lyme; Michael R. Johnson, Gales Ferry; Jasjit S. Bindra, Groton, and Thomas K. Schaaf, Old Lyme, all of Conn., assignors to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. Nos. 271,220, July 13, 1972, abandoned, and Ser. No. 425,519, Dec. 17, 1973, abandoned. This application July 3, 1974, Ser. No. 485,431

Int. Cl.² C07C *61/06*

U.S. Cl. 260—520 B 13 Claims

1. 13,14 dihydro-ω-pentanorprostaglandins of the A_2, F_2 and E_2 series having at the 15-position one hydrogen or lower alkyl substituent and one substituent of the formula:

$Ar—CH_2—$

wherein Ar is α- or β-naphthyl; phenyl; 3,4-dimethoxyphenyl; 3,4-methylenedioxyphenyl; 3,4,5-trimethoxyphenyl; or mono-substituted phenyl wherein said substituent is halo, trifluoromethyl, phenyl, lower alkyl or lower alkoxy.

4,011,263
PROCESS FOR THE PRODUCTION OF N-ACETYL-L-METHIONINE

Hans Wagner, Constance, and Alfred Maierhofer, Allensbach, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed May 11, 1976, Ser. No. 685,420

Claims priority, application Germany, July 4, 1975, 2529854

Int. Cl.² C07C *101/04*

U.S. Cl. 260—534 S **10 Claims**

1. A process for the production of N-acetyl-L-methionine comprising reacting L-methionine with acetic anhydride in the presence of aqueous alkali at a temperature between about 20° and 60° C., while maintaining the pH between about 6.5 and 10.0.

4,011,264
CARBOXYMETHYLOXYSUCCINATES

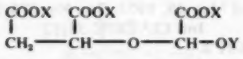
Ralph House, El Sobrante, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Dec. 20, 1974, Ser. No. 534,999

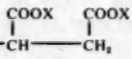
Int. Cl.² C07C *59/12*

U.S. Cl. 260—535 P **5 Claims**

1. Detergent-active materials of the formula



wherein Y is H or



and X is H or a water-soluble salt-forming cation.

4,011,265
3,3''-DIAMINO- OR 3,3''-DIMETHOXY-OCTANITRO-M-TERPHENYL

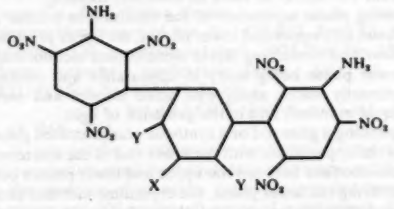
Joseph C. Dacons, Washington, D.C., and Richard R. Minesinger, Silver Spring, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 19, 1970, Ser. No. 24,914

Int. Cl.² C07C *87/60*

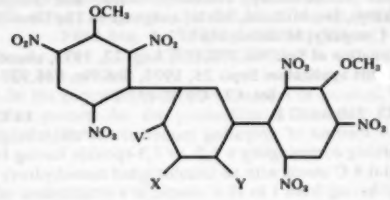
U.S. Cl. 260—578 **6 Claims**

1. A compound according to the formula



wherein X and Y are selected from the group consisting of H and NO_2 provided that when X is H, Y is NO_2 and when Y is H, X is NO_2.

4. A compound according to the formula



wherein X and Y are selected from the group consisting of H and NO_2 provided that when X is H, Y is NO_2 and when Y is H, X is NO_2.

4,011,266
2-VINYL-FLUORENONE AND DERIVATIVES THEREOF

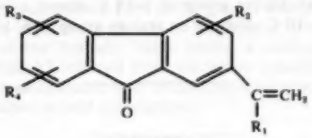
James M. Pearson, Webster, and John F. Yanus, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 31, 1973, Ser. No. 411,577

Int. Cl.² C07C *49/76*, *49/84*

U.S. Cl. 260—590 FB **8 Claims**

1. A composition of matter characterized by the structural formula:



wherein R_1 is hydrogen or methyl and R_2, R_3 and R_4 are hydrogen, halogen, substituted or unsubstituted alkyl groups containing 1 to 4 carbon atoms or alkoxy groups containing 1 to 4 carbon atoms.

4,011,267
PERFLUOROALKYLETHER SUBSTITUTED ARYL PHOSPHINES AND THEIR SYNTHESIS

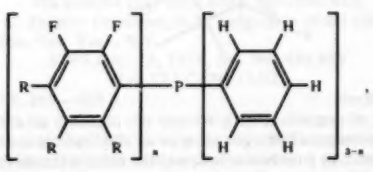
Christ Tamborski, Dayton, and Carl E. Snyder, Jr., Trotwood, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 6, 1975, Ser. No. 629,469

Int. Cl.² C07F *9/50*

U.S. Cl. 260—606.5 P **8 Claims**

1. A fluorinated phosphine having the following formula:



where one of the R's is a perfluoroalkylether group, two of the R's are fluorine, and *n* is 1, 2 or 3.

4,011,268
METHOD OF PREPARING MONOETHERS OF ALKYLENE GLYCOLS

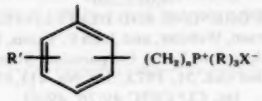
Suzanne V. McKinley, Wellesley, Mass., and Joseph W. Rakshys, Jr., Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 390,453, Aug. 22, 1973, abandoned. This application Sept. 25, 1975, Ser. No. 616,727

Int. Cl.² C07C *41/02*

U.S. Cl. 260—613 D **14 Claims**

1. A method of preparing monethers of alkylene glycols comprising commingling a 1,2- or 1,3-epoxide having from 2 to about 8 C atoms with an unsubstituted monohydroxy compound having from 1 to 10 C atoms, at a temperature of from about 50° to about 150° C., in the presence of a catalytically active amount of a catalyst which is a polymer, insoluble in the reaction mixture, having a carbon to carbon backbone, cross-linked with carbon to carbon atoms, said polymer having a plurality of



or CO_2 $(CH_2)_mP^+(R)_3X^-$ pendant groups wherein n is an integer from 1 to 3, m is an integer of from 1–6, R is an alkyl group of from 1 to about 6 C atoms, R′ is H, CN or one or more alkyl groups having a total of up to 6 C atoms, and X is hydroxyl, an alkoxy group of 1–10 C atoms, a cycloalkoxy group of 5–10 C atoms or an aryloxy group of 6–10 C atoms.

4,011,269
PROCESS FOR THE PREPARATION OF SESQUITERPENIC DERIVATIVES

Ferdinand Näf, Geneva, and Gunther Ohloff, Bernex, both of Switzerland, assignors to Firmenich S.A., Geneva, Switzerland

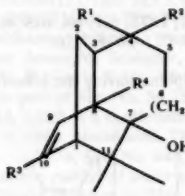
Filed Aug. 20, 1975, Ser. No. 606,054

Claims priority, application Switzerland, Aug. 23, 1974, 11503/74

Int. Cl.² C07C *29/00*

U.S. Cl. 260—617 R **9 Claims**

1. A process for the preparation of a compound of formula (I)



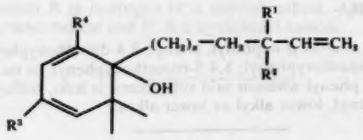
(I)

and wherein:

each of symbols R^1, R^2, R^3 and R^4, identical or different, represents a hydrogen atom or an alkyl radical containing from 1 to 6 carbon atoms, and the index n stands for zero or 1

which comprises reacting

A hydroxyl compound of formula (II)



(II)

wherein the index n and the symbols R^1, R^2, R^3 and R^4 have the aforementioned meaning, at a temperature from about 200° to about 400° C and a pressure of from about 1 to 20 atmospheres, with a strongly basic agent, to yield the compound of formula (I).

4,011,270
RECRYSTALLIZED MENTHOL PRODUCT AND METHOD OF MAKING

Richard Gardner Carrington, Chehalis, Wash., assignor to I. P. Callison & Sons, Inc., Seattle, Wash.

Filed May 28, 1974, Ser. No. 473,733

Int. Cl.² C07C *35/12*

U.S. Cl. 260—631 R **6 Claims**

1. A method of obtaining a menthol product from crude natural menthol, comprising the steps of:

dissolving the crude natural menthol in an alcohol-water solution containing 20–40% by volume ethyl alcohol, with the remainder water, to form an emulsion thereof at a temperature ranging from 18°–25° C.,

allowing phase separation of the emulsion in a clear glass vessel into an upper phase and a lower phase, the upper phase containing liquid menthol and ethyl alcohol and the lower phase containing primarily water, some alcohol and residual liquid menthol, and in the presence of light

suspending a glass rod or synthetic plastic-coated glass rod in the upper phase with the lower end of the rod touching the interface between the upper and lower phases but not entering the lower phase, the menthol contained in the upper phase recrystallizing on the rod above the liquid level of the upper phase.

6. A crystalline menthol product obtained from crude menthol crystals by:

dissolving crude natural menthol in an alcohol-water solution containing 20–40% by volume ethyl alcohol and the remainder water in a glass vessel at a temperature ranging from 18°–25° C. to form an emulsion thereof,

allowing phase separation of the emulsion in a clear glass vessel into upper and lower phases, the upper phase being clear and containing liquid menthol and alcohol and the lower phase being milky in appearance and containing primarily water, along with some alcohol and residual liquid menthol, and in the presence of light

suspending a glass rod or a synthetic plastic-coated glass rod in the upper phase with the lower end of the rod touching the interface between the upper and lower phases but not entering the lower phase, the crystalline menthol product recrystallizing on the rod above the liquid level of the upper phase, the rod having an outer exposed surface of a material selected from the group consisting of glass, polyethylene or polypropylene.

4,011,271

PREPARATION AND USE OF MAGNESIUM ACETYLENE COMPLEX

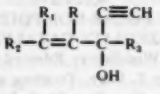
John Nicholson Gardner, Garrison, N.Y., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 460,846, April 15, 1974, Pat. No. 3,985,817, which is a continuation-in-part of Ser. No. 402,544, Oct. 1, 1973, abandoned. This application May 3, 1976, Ser. No. 682,247

Int. Cl.² C07C 29/00

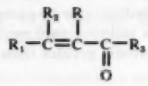
U.S. Cl. 260—638 Y 6 Claims

1. A process for the producing an ethynyl carbinol of the formula:



wherein R_1 is lower alkyl, lower alkenyl or hydrogen; R_2 is hydrogen or a hydrocarbon having from 1 to 18 carbon atoms; R_1 and R_2 taken together with their attached carbon atom form a cyclic member selected from the group consisting of cyclo lower alkyl or cyclo lower alkenyl; and R and R_3 are lower alkyl, lower alkenyl or hydrogen;

comprising reacting a mixture of sodium acetylide and a magnesium acetylene complex with an oxo compound of the formula:



wherein R, R_1, R_2 and R_3 are as above;

in a liquid ammonia reaction medium wherein the mixture contains at least 5% by weight of the magnesium acetylene complex said magnesium acetylene complex being prepared by a process comprising reacting in liquid ammonia, magnesium and acetylene gas wherein the reaction medium contains from about 5 to 97% by weight of sodium, as metal or as sodamide, based on the weight of sodium and magnesium.

4,011,272

PROCESS FOR PRODUCING TERTIARY BUTYL ALCOHOL

Hideo Matsuzawa; Minoru Ikeda; Yukinobu Sugimoto, and Shuji Uchida, all of Ohtake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 479,037, June 13, 1974, abandoned. This application July 9, 1975, Ser. No. 594,354

Claims priority, application Japan, July 25, 1973, 48-83719; Mar. 7, 1974, 49-26491

Int. Cl.² C07C 29/04

U.S. Cl. 260—641 5 Claims

1. A process for continuously producing t-butyl alcohol, which comprises reacting isobutylene with water at 20° to 80° C in the presence of an acidic ion-exchanger and from 30 to 500 moles per 100 moles of water of a saturated aliphatic carboxylic acid having from 1–6 carbon atoms under conditions such that the liquid product obtained is a homogeneous solution.

4,011,273

METHOD FOR THE PRODUCTION OF GUERBET ALCOHOLS UTILIZING INSOLUBLE LEAD CATALYSTS

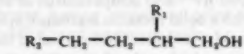
Phillip Gary Abend, Teaneck, and Peter Leenders, Allendale, both of N.J., assignors to Henkel Inc., Teaneck, N.J.

Filed Aug. 4, 1975, Ser. No. 601,371

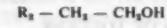
Int. Cl.² C07C 29/00

U.S. Cl. 260—642 C 6 Claims

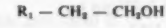
1. In the process for the condensation of alcohols by the Guerbet process for the production of branched alcohols having the formula



wherein R_2 and R_1 are members having from 2 to 20 carbon atoms selected from the group consisting of alkyl, alkenyl, alkynyl, cycloalkyl alkyl, phenylalkyl and alkylphenylalkyl comprising condensing an alcohol having the formula



with an alcohol having the formula



wherein R_2 and R_1 have the above-assigned values in the presence of an alkali under conditions whereby the water of reaction is removed substantially as fast as it is formed in the presence of a catalyst at temperatures above 100° C to the reflux temperature, and recovering said branched alcohols, the improvement consisting of conducting said condensation in the presence of from 0.05 to 3.0 gm per mol of total alcohol, of an insoluble lead salt of an oxyacid of a group IV element of the Periodic Table having a molecular weight greater than 27 selected from the group consisting of lead silicates, lead titanates, lead zirconates, lead germanates and lead hafnates, as said sole catalyst.

4,011,274

1,1-DIPHENYL ETHANE PROCESS

Masaaki Watanabe; Masao Hasegawa; Jiroe Yamada, and Kouichi Kobayashi, all of Tokyo, Japan, assignors to Asahi-Dow Limited, Tokyo, Japan

Division of Ser. No. 423,986, Dec. 12, 1973, abandoned. This application May 19, 1976, Ser. No. 687,768

Claims priority, application Japan, Jan. 13, 1973, 48-6735

Int. Cl.² C07C 15/10

U.S. Cl. 260—668 C 4 Claims

1. A process for obtaining 1,1-diphenyl ethane, which comprises

reacting ethylene and benzene to form ethyl benzene and high boiling by-products, and

fractionally distilling said higher boiling by-products and recovering a fraction consisting essentially of 1,1-diphenyl ethane.

4,011,275

CONVERSION OF MODIFIED SYNTHESIS GAS TO OXYGENATED ORGANIC CHEMICALS

John C. Zahner, Princeton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 23, 1974, Ser. No. 499,869

Int. Cl.² C07C 15/02

U.S. Cl. 260—668 R 9 Claims

1. In the process of converting synthesis gas to gasoline boiling range hydrocarbons by the sequential steps of converting said synthesis gas to a product comprising predominantly methanol and then converting at least the methanol portion of this product to gasoline boiling range hydrocarbons by contact thereof with a crystalline aluminosilicate zeolite having a silica

to alumina ratio of at least about 12, a constraint index of 1 to 12 and a crystal density of not substantially below about 1.6 grams per cubic centimeter, at a temperature of at least about 500° F; the improvement, whereby increasing the proportion of synthesis gas converted to said product comprising predominantly methanol and dimethyl ether available for conversion to gasoline boiling range hydrocarbons by contact with said zeolite, which comprises adjusting the hydrogen-carbon monoxide mole ratio in said synthesis gas to about 0.8 to 1.7, which is a hydrogen deficiency with respect to methanol stoichiometry; converting said hydrogen deficient synthesis gas, at elevated pressures of about 500 to 4000 psig, space velocity of about 10,000 hv^{-1} to 40,000 hv^{-1} and temperatures of about 400 to 570° F in contact with a solid metallic methanol synthesis catalyst having a solid acid component incorporated therewith, to a product comprising a high ratio of dimethyl ether to methanol and representing a high conversion of synthesis gas thereto; and converting at least said dimethyl ether and methanol to gasoline boiling range hydrocarbons as aforesaid.

4,011,276

DISPROPORTIONATION OF TOLUENE

Chin-Chiun Chu, South Plainfield, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 28, 1976, Ser. No. 680,998
Int. Cl.² C07C *3/62*
U.S. Cl. 260—672 T **13 Claims**

1. A process for effecting disproportionation of toluene to produce benzene and xylenes in which the proportion of para-xylene isomer is in excess of its normal equilibrium concentration which comprises contacting toluene under conditions effective for accomplishing said disproportionation in the presence of a catalyst comprising a crystalline aluminosilicate zeolite, said zeolite having a silica to alumina ratio of at least about 12, a constraint index within the approximate range of 1 to 12, said catalyst having been modified by the addition thereto of phosphorus oxide and magnesium oxide, each in an amount of at least about 0.25 percent by weight.

4,011,277

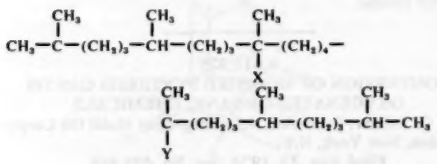
PREPARATION OF SQUALANE BY HYDROGENOLYSIS

Takashi Nishida; Yoichi Ninagawa; Kazuo Itoi, all of Kurashiki; Yutaka Omura, and Haruo Nagai, both of Niigata, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki and Kyowa Gas Chemical Industry Co., Ltd., Tokyo, both of Japan

Filed Mar. 25, 1974, Ser. No. 454,694
Claims priority, application Japan, Apr. 7, 1973, 48-39667; Apr. 26, 1973, 48-48193; Sept. 7, 1973, 48-101416
Int. Cl.² C07C *9/14*
U.S. Cl. 260—676 R **12 Claims**

1. A process for preparing squalane which comprises submitting,

i. a compound having the formula (I):



(I)

wherein X and Y represent hydroxy radicals or one of X and Y represents a hydroxy radical and the other represents a hydrogen atom,

ii. a mixture of compounds of the formula (I), or a mixture of (iii) with squalane, to hydrogenolysis in the presence of a metal catalyst selected from the group consisting of nickel, cobalt, palladium, platinum, rhodium, iridium, ruthenium, osmium and rhenium and a compound thereof unsupported or supported on a carrier and in the presence of an acidic substance selected from the group consisting of organic carboxylic acids, Bronsted acids, Lewis acids, solid acids, and hydrogen salts of a strong acid and a weak base at a temperature of from about 100° to 300° C. under a hydrogen pressure of from about 20 to about 150 kg/cm².

4,011,278

CONVERSION OF POLAR COMPOUNDS USING A ZSM-5 ZEOLITE CATALYST

Charles J. Plank, Woodbury; Edward J. Rosinski, Pedricktown, and George T. Kerr, Trenton, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 296,370, Oct. 5, 1972, abandoned, which is a continuation-in-part of Ser. No. 821,980, May 5, 1969, abandoned, which is a continuation-in-part of Ser. No. 494,846, Oct. 11, 1965, Pat. No. 3,442,795, which is a continuation-in-part of Ser. No. 261,494, Feb. 27, 1963, abandoned. This application Feb. 3, 1975, Ser. No. 546,863
Int. Cl.² C07C *1/24*
U.S. Cl. 260—682 **2 Claims**

1. In the process of dehydrating an alcohol, by contacting it at a temperature of about 70° to 1400° F with a solid crystalline aluminosilicate zeolite acidic catalyst having a pore size sufficient to permit the diffusion of said alcohol thereinto and to permit dehydration therein, the improvement whereby carrying out said dehydration with exceptional catalyst stability, which comprises utilizing said zeolite having a silica to alumina ratio substantially greater than 10 to 1.

4,011,279

PROCESS FOR MAKING POLYIMIDE-POLYDIORGANOSILOXANE BLOCK POLYMERS

Abe Berger, Schenectady, and Peter C. Juliano, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Sept. 23, 1975, Ser. No. 615,991
Int. Cl.² C08L *83/10*
U.S. Cl. 260—824 R **5 Claims**

1. A method for making polyimide-polydiorganosiloxane block copolymer which comprises:

1. effecting azeotropic water removal from a refluxing mixture of an organic dianhydride and organic diamine in the presence of an organic solvent and an effective amount of an organic acid catalyst where the ratio of the organic dianhydride to the organic diamine utilized in the mixture has a value greater than 1,
2. allowing the reaction mixture of 1 to cool to a temperature of at least 20° C and adding to the resulting mixture an amount of amino alkyl terminated polydiorganosiloxane which is substantially the stoichiometric equivalent to the excess of organic dianhydride utilized in the mixture of 1, and agitating the resulting mixture for a time sufficient to effect polyimide-polydiorganosiloxane block copolymer formation,
3. recovering the polyimide-polydiorganosiloxane block copolymer from (2).

4,011,280

PROCESS FOR THE PRODUCTION OF BINDERS FOR WEATHER-PROOF WOOD MATERIALS AND PRODUCT

Friedrich Josten, Rheinkamp-Utfort, and Martin Cherubim, Rheinkamp-Eick, both of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

Filed Dec. 6, 1974, Ser. No. 530,477

Claims priority, application Germany, Dec. 21, 1973, 2363797

Int. Cl.² C08L *61/00, 61/34;* C08G *8/26*

U.S. Cl. 260—828 14 Claims

1. A process for the production of binders derived from phenol-acetone-formaldehyde co-condensates, for use in weather-proof wood materials consisting essentially of as a first step condensing phenol and formaldehyde in a mole ratio of between 1:1.5 and 1:5 in the presence of from 0.1 to 1 mole of alkali hydroxide, based on phenol, at a temperature of from 40° to 100° C. to obtain a precondensate of a viscosity of from about 10 to 20 seconds measured at 20° C. in the 4 mm DIN Standards flow cup and subsequently, in the second step, adding to this precondensate from 0.1 to 1 mole, based on phenol, of acetone, 2 to 6 moles based on acetone, of formaldehyde and 0 to 1 mole of alkali metal hydroxide, based on phenol plus acetone, and continuing the condensation reaction at 40° to 100° C. until having obtained, for a solids content of from 40 to 50 percent, a viscosity of from 20 to 200 seconds measured at 20° C. in the 4 mm DIN Standards flow cup.

4,011,281

POLYETHER THIOUREA EPOXY CURING AGENTS

Harold George Waddill, and Heinz Schulze, both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Filed Mar. 6, 1975, Ser. No. 555,843

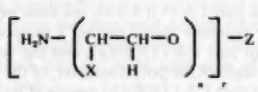
Int. Cl.² C08G *45/06*

U.S. Cl. 260—830 S 4 Claims

1. A curable epoxy resin composition consisting essentially of:

a vicinal polyepoxide; and

an effective amount of a polyether thiourea curing agent having terminal primary amino groups and being formed by the reaction of a compound selected from a group consisting of thiourea, thiourea forming compounds and carbon disulfide with a polyoxyalkylenepolyamine of the formula



wherein X is a hydrogen or methyl radical, Z is a hydrocarbon radical having 2 to 5 carbon atoms forming from 2 to 4 external ether linkages, *n* is a number from 1 to about 15 and *r* is a number from 2 to 4 wherein the molar ratio of said compound to said polyoxyalkylenepolyamine is from 0.20 to 0.83, wherein X is a hydrogen the molecular weight is approximately 650 and wherein X is a methyl radical the molecular weight is from about 200 to 2,000.

4,011,282

MALEIC ANHYDRIDE/2,5-DIHYDROFURAN COPOLYMERS

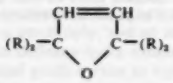
Robert Bacskai, Kensington, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Sept. 10, 1975, Ser. No. 612,058

Int. Cl.² C08F *220/08, 63/00, 63/02*

U.S. Cl. 260—836 4 Claims

3. A heat-curable composition, which comprises from about 5% to about 50% by weight of a curing agent comprising the water-soluble addition copolymer of a dihydrofuran compound having the formula



wherein each R is independently hydrogen of lower alkyl, and maleic anhydride wherein the average mol ratio of said dihydrofuran to anhydride is from about 1:2 to about 1:3, said copolymer having a melting point of from about 40° C to about 60° C and an epoxy resin.

4,011,283

POLYMERIZATION PROCESS

Alan Charles Sturt, Guildford, England, assignor to BP Chemicals Limited, London, England

Continuation of Ser. No. 107,855, Jan. 19, 1971, abandoned. This application Mar. 19, 1973, Ser. No. 342,370

Claims priority, application United Kingdom, Feb. 6, 1970, 5798/70

Int. Cl.² C08L *9/08*

U.S. Cl. 260—880 R 5 Claims

1. A process which comprises polymerising under emulsion polymerisation conditions a first monomeric material other than vinyl chloride that gives rise to a non-film forming polymer having a glass transition temperature above 10° C in aqueous emulsion, said first monomeric material being selected from the group consisting of ethylene, propylene, styrene, acrylonitrile, methyl methacrylate, a vinyl ester, butadiene, isoprene, chloroprene, ethyl acrylate and mixtures thereof, allowing the emulsion polymer to absorb an amount of a second monomeric material selected from the group consisting of ethylene, propylene, styrene, acrylonitrile, methyl methacrylate, a vinyl ester, butadiene, isoprene, chloroprene, ethyl acrylate, vinyl chloride, and mixtures thereof not greater than the weight of the emulsion polymer, destroying the emulsion by adding an acid or a multivalent ion in the presence of a suspension stabilising system, and polymerising the absorbed second monomeric material under suspension polymerising conditions.

4,011,284

PROCESS FOR THE MANUFACTURE OF IMPACT-RESISTANT POLYVINYL AROMATIC COMPOUND

George Gawne, Amsterdam, and Cornelis Ouwerkerk, The Hague, both of Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed June 25, 1975, Ser. No. 590,178

Claims priority, application United Kingdom, June 25, 1974, 28128/74

Int. Cl.² C08L *9/06*

U.S. Cl. 260—880 R 7 Claims

1. In the continuous process for the manufacture of an impact-resistant polyvinyl-aromatic compound by the bulk polymerization of a solution of a vinyl-aromatic monomer in admixture with an elastomeric polymer and in the optional presence of up to 20% by weight of hydrocarbon diluent, calculated on the starting vinyl-aromatic monomer, where said solution is successively passed through an agitated prepolymerication zone, a backmixed intermediate polymerization zone and an unstirred final polymerization zone, the improvement which comprises reacting said solution in an intermediate zone having from 2 to 4 reactors, inclusive, wherein the reaction mixture is maintained in each reactor in substantially homogeneous condition by agitation, and heat of polymerization is removed from each reactor by evaporation of vaporizable components of the mixture, and wherein the monomer conversion in said intermediate zone is advanced

from a range of about 20% to about 35% entering the first intermediate reactor to a range of about 65% to about 85% leaving the last intermediate reactor, and controlling the conversion in said intermediate zone so that the difference in the percent of conversion in successive reactors in said zone does not exceed 25%.

4,011,285

MOLDING COMPOSITION COMPRISING A BLEND OF POLY(TETRAMETHYLENE TEREPHTHALATE), A POLYETHERESTER AND A RADIAL TELEBLOCK COPOLYMER

Robert W. Seymour, and Willis C. Wooten, Jr., both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 14, 1976, Ser. No. 687,114
Int. Cl.² C08L 67/06
U.S. Cl. 260—873 **7 Claims**

1. A composition comprised of, based on the weight of the composition, an admixture of

A. from 96 to 70 weight percent poly(tetramethylene terephthalate) having an inherent viscosity of at least 0.5,

B. from 2 to 15 weight percent of a polyetherester having an inherent viscosity of at leat 0.4 selected from the group consisting of

1. a first polyetherester comprised of

A. a dicarboxylic acid component comprised of

a. 100–60 mole percent terephthalic acid, and

b. 0–40 mole percent of an aliphatic or aromatic dicarboxylic acid having a molecular weight of less than 300, and

B. a diol component comprised of

a. a glycol comprised of 100–60 mole percent tetramethylene glycol and 0–40 mole percent of an aliphatic or aromatic glycol having a molecular weight of less than 300, and

b. 10–60 weight percent, based on the weight of the polyetherester, of a poly(alkylene oxide) glycol having 2, 3 or 4 carbon atoms in the repeating unit and having a molecular weight in the range of 400 to 5,000,

wherein the sum of the total mole percent amount of aliphatic or aromatic dicarboxylic acid having a molecular weight of less than 300 in part 1.B.(1)(A)(b), the mole percent amount of aliphatic or aromatic glycol having a molecular weight of less than 300 in part 1.B.(1)(B)(a), and the weight percent, based on the weight of the polyetherester, of the poly(alkylene oxide) glycol in part 1.B.(1)(B)(b) equals at least 35 but does not exceed 80,

2. a second polyetherester comprised of

A. a dicarboxylic acid component comprised of terephthalic acid, and

B. a diol component comprised of

a. a glycol comprised of 90–60 mole percent 1,4-cyclohexanedimethanol and 10–40 mole percent ethylene glycol or tetramethylene glycol, and

b. 10–50 weight percent, based on the weight of the polyetherester, of a poly(alkylene oxide) glycol having 2 to 4 carbon atoms in the repeating unit and having a molecular weight in the range of 400 to 2,000,

C. from 2 to 15 weight percent of a radial teleblock copolymer prepared by a method which comprises polymerizing monomers selected from the group consisting of conjugated dienes and vinyl-substituted aromatic compounds in the presence of an organomonolithium initiator and reacting the resulting mono-lithium-terminated polymer with from 0.1 to about 1 equivalent based on the lithium in the polymer of a compound having at least three reactive sites capable of reacting with the carbon-lithium bond of the polymer, exclusive of organic reactant materials having halogen atoms that are attached to a carbon atom which is alpha to an activating group selected from the group consisting of an ether linkage, a carbonyl and a carbon-to-carbon double bond, thereby coupling said polymer with said compound.

4,011,286

POLYETHERESTER-RADIAL TELEBLOCK COPOLYMER BLEND MOLDING COMPOSITION

Robert W. Seymour; Freddie A. Shepherd, and Theodore F. Gray, Jr., all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed July 16, 1976, Ser. No. 705,964
Int. Cl.² C08L 67/06
U.S. Cl. 260—873 **7 Claims**

1. A composition comprised of, based on the weight of the composition, an admixture of

A. from 95 to 50 weight percent of a polyetherester having an inherent viscosity of at least 0.4 selected from the group consisting of

1. a first polyetherester comprised of

A. a dicarboxylic acid component comprised of

a. 100–60 mole percent terephthalic acid, and

b. 0–40 mole percent of an aliphatic or aromatic dicarboxylic acid having a molecular weight of less than 300, and

B. a diol component comprised of

a. a glycol comprised of 100–60 mole percent tetramethylene glycol and 0–40 mole percent of an aliphatic or aromatic glycol having a molecular weight of less than 300, and

b. 10–60 weight percent, based on the weight of the polyetherester, of a poly(alkylene oxide)glycol having 2, 3, or 4 carbon atoms in the repeating unit and having a molecular weight in the range of 400 to 5,000,

wherein the sum of the total mole percent amount of aliphatic or aromatic dicarboxylic acid having a molecular weight of less than 300 in part 1.A.(1)(A)(b), the mole percent amount of aliphatic or aromatic glycol having a molecular weight of less than 300 in part 1.A.(1)(B)(a), and the weight percent, based on the weight of the polyetherester, of the poly(alkylene oxide)glycol in part 1.A.(1)(B)(b) equals at least 35 but does not exceed 80,

2. a second polyetherester comprised of

A. a dicarboxylic acid component comprised of

a. 100–60 mole percent terephthalic acid, and

b. 0–40 mole percent of an aliphatic or aromatic dicarboxylic acid having a molecular weight of less than 300, and

B. a diol component comprised of

a. a glycol comprised of 90–60 mole percent 1,4-cyclohexanedimethanol and 10–40 mole percent ethylene glycol or tetramethylene glycol, and

b. 10–50 weight percent, based on the weight of the polyetherester, of a poly(alkylene oxide)glycol having 2 to 4 carbon atoms in the repeating unit and having a molecular weight in the range of 400 to 2,000,

B. from 5 to 50 weight percent of a radial teleblock copolymer prepared by a method which comprises polymerizing monomers selected from the group consisting of conjugated dienes and vinyl-substituted aromatic compounds in the presence of an organomonolithium initiator and

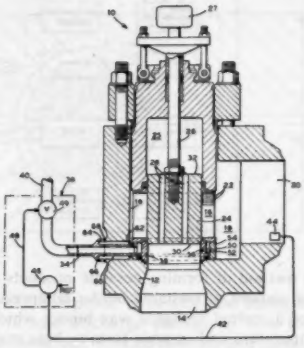
reacting the resulting monolithium-terminated polymer with from 0.1 to about 1 equivalent based on the lithium in the polymer of a compound having at least three reactive sites capable of reacting with the carbon-lithium bond of the polymer, exclusive of organic reactant materials having halogen atoms that are attached to a carbon atom which is alpha to an activating group selected from the group consisting of an ether linkage, a carbonyl and a carbon-to-carbon double bond, thereby coupling said polymer with said compound.

4,011,287

STEAM CONDITIONING VALVE

David John Marley, Santa Ana, Calif., assignor to Control Components, Inc., Irvine, California

Filed July 11, 1975, Ser. No. 594,992
Int. Cl.² B01F *3/04*
U.S. Cl. 261—64 R **12 Claims**



1. A steam conditioning valve for reducing high temperature high pressure steam at the inlet of the valve to low temperature low pressure steam at the outlet of the valve comprising:

a valve housing having a steam inlet area and a steam outlet area;

a series of members forming a multi-turn labyrinth mounted in said valve housing between the inlet area and the outlet area to require the steam to flow through the multi-turn labyrinth before reaching the outlet area;

an orifice member spacedly mounted in the inlet area of said valve housing to prevent substantial physical contact with said valve housing, said orifice member also being mounted proximate to said series of members for spraying cooling fluid into the inlet area side of said series of members; and

a cooling fluid line spacedly extending through said valve housing to prevent substantial physical contact with said valve housing and being connected to said orifice member to supply cooling fluid to said orifice member.

4,011,288

DISPOSABLE HUMIDIFIER ASSEMBLY

Robert Assenheimer, Boonton, N.J., and Michael O. Pekkarinen, Lincolnshire, Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Mar. 14, 1975, Ser. No. 558,601
Int. Cl.² A61M *15/00*
U.S. Cl. 261—121 R **10 Claims**

1. A gas humidifier set comprising:

a solution bottle;

a cap-seal member overlying and sealing the mouth of said bottle, said cap-seal member defining spaced first and second piercable seal portions;

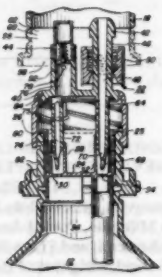
first and second guide means extending upwardly from said cap-seal member, respectively adjacent to said first and second seal portions;

a connector assembly enclosing a space between said cap-seal member, said connector assembly comprising:

a gas inlet and outlet member defining a first conduit portion extending transversely through a base portion, an outer end of said first conduit portion being adapted for connection to a gas supply, and an inner end of said first conduit portion defining spike means and extending into said first cap-seal guide means in a position spaced from said cap-seal but adapted to puncture said first seal portion when moved into engagement therewith;

a second conduit portion extending outwardly from and through said base portion of said gas inlet and outlet member, to define a gas passage through said base portion, the outer end of said second conduit portion being adapted for connection to a gas administration device;

a third conduit portion extending downwardly from said base portion of said gas inlet and outlet member, said third conduit portion defining a gas passage communicating with the passage defined by said second conduit portion, the inner end of said third conduit portion defining spike means and extending into said second cap-seal guide means in a position spaced from said cap-seal but adapted to puncture said second cap-seal when moved into engagement therewith;



an annular member overlying said inlet and outlet member in sliding engagement therewith and engaging the neck of said solution bottle;

means associated with said connector assembly causing said first and second conduit portions to move in a direction to puncture said cap-seal when said annular member is moved in a selected direction;

said second and third conduit portions being axially spaced from each other, said space enclosed by said cap-seal member and base portion of the gas inlet member defining an expansion chamber for the passage of gas from said third conduit portion to said second conduit portion.

4,011,289

MANUFACTURE OF MICROGLOBULES

Arend Jaman Noothout, Oosterbeek, and Otakar Votocek, Arnhem, both of Netherlands, assignors to Reactor Centrum Nederland, The Hague, Netherlands

Continuation-in-part of Ser. No. 284,061, Aug. 28, 1972, abandoned. This application Jan. 22, 1974, Ser. No. 435,506
Claims priority, application Netherlands, Aug. 26, 1971, 7111738
Int. Cl.² G21C *21/00*; C09K *3/00*; G21C *19/46*
U.S. Cl. 264—.5 **5 Claims**

1. In a process for preparing microspheres which includes dispersing into an organic phase droplets of an inorganic aqueous phase having a viscosity $\geq$ 12 centipoise at 0° C which inorganic aqueous phase comprises an hydrated metal oxide selected from the group consisting of metal oxides of actinide metals, lanthanide metals, yttrium and scandium, into a water-immiscible organic phase having a temperature of from 50° to 150° C and having a viscosity at said temperature of between about 0.5 and about 8.5 centipoise, whereby the

surface tension maintains said droplets in a spherical shape as they solidify, then removing the thus formed microspheres,

the improvement of making small microglobules substantially devoid of internal voids and surface dents thereon, comprising, in combination:

a. incorporating in said organic phase a surface active agent in an amount of between about 0.04 and 2.0 percent by volume based on the volume of said organic phase, said amount selected such that forming and solidifying microspheres just fail to adhere to each other while at the same time said microspheres retain their spherical shape during formation, and

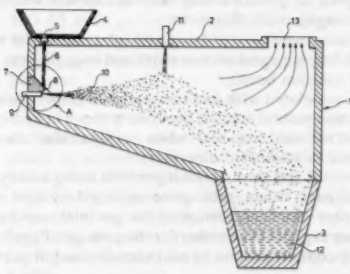
b. spraying the inorganic aqueous phase into an atmosphere above the organic phase so to disperse the formed droplets over and onto the surface of said organic phase, thereby producing said small microglobules having a diameter ranging from about 5 to about 250 microns.

4,011,290

METHOD AND DEVICE FOR DISPERSING A MELT WITH A FLUID JET

Seppo Ilmari Blomqvist, Haukilahti; Launo Leo Lilja, Pori; Valto Johannes Mäkitalo, Pori; John Henrik Relander, Pori; Matti Elias Honkaniemi, and Frans Heikki Tuovinen, both of Tornio, all of Finland, assignors to Outokumpu Oy, Helsinki, Finland

Filed Dec. 5, 1974, Ser. No. 529,807
Claims priority, application Finland, Dec. 19, 1973, 733922
Int. Cl.² B22D *23/08*
U.S. Cl. 264—12 **15 Claims**



1. A method for dispersing a melt by means of a jet of at least one medium selected from the group of gaseous and liquid media, by causing the melt flow to impinge against a continuous laterally open deflecting surface in the dispersion space to form a thin, widening, laterally unconfined, film of the melt before it meets the jet of the dispersing medium.

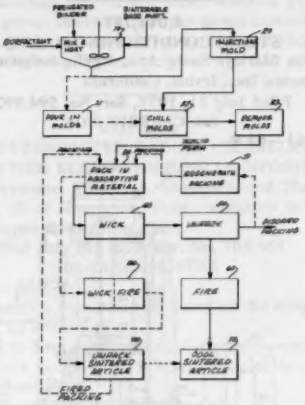
6. An improved device for dispersing a melt by means of a jet of at least one medium selected from the group of gaseous and liquid media having a reactor, means for feeding a melt to be dispersed into the reactor; and means for spraying at least one substance selected from the group of gaseous and liquid dispersing media into the reactor towards the melt flow to disperse this flow; the improvement comprising feeding means for dispersing medium fitted in the reactor between the intersection point of the melt and the dispersing medium and the feeding point of the melt; and a continuous laterally open surface slanted in relation to the melt flow and directed away from the feeding means for the dispersing medium to spread this flow into an even and widening, laterally unconfined thin film before it meets the jet of the dispersing medium.

4,011,291

APPARATUS AND METHOD OF MANUFACTURE OF ARTICLES CONTAINING CONTROLLED AMOUNTS OF BINDER

James D. Curry, St. Joseph, Mich., assignor to Leco Corporation, St. Joseph, Mich.

Continuation of Ser. No. 408,821, Oct. 23, 1973, abandoned.
This application Sept. 2, 1975, Ser. No. 609,493
Int. Cl.² B29D *27/04*
U.S. Cl. 264—43 **13 Claims**



1. In a method of forming ceramic products containing a controlled amount of meltable binder comprising forming a mixture of a melted meltable wax binder which is solid at room temperature and ceramic forming base materials into a solid article of desired configuration by allowing said mixture to solidify in a mold, the improvement in said method comprising the steps of:

packing said article into a binder-absorptive material for absorbing said binder when it is converted to a liquid state wherein said binder has a melting point less than the temperature at which said base material is undesirably heat altered and wherein said binder absorptive material has a melting point greater than the melting point of the binder, is non-reactive with said binder, and has a sufficiently small particle size so as to not yield imperfections when contacting the solidified mixture and

elevating and maintaining the temperature of said article above the melting point of the meltable binder but below the vaporization temperature of said binder causing said binder to become liquid and allowing said binder to be drawn from said article into said binder-absorptive material by a wicking action until at least 45% of said binder is wicked out of said article and into said binder absorptive material; and thereafter firing said article in a kiln to produce a ceramic product.

4,011,292

METHOD FOR PRODUCING SHEET MATERIAL WITH MULTICOLOR STRIATED PATTERN AND SHEET MATERIAL PRODUCED THEREBY

Robert E. Randall, Kensington, Conn., assignor to Rowland, Incorporated, Kensington, Conn.

Division of Ser. No. 457,770, April 4, 1974, Pat. No. 3,920,366. This application July 7, 1975, Ser. No. 593,882
Int. Cl.² B29F *1/12*, *3/12*
U.S. Cl. 264—75 **6 Claims**

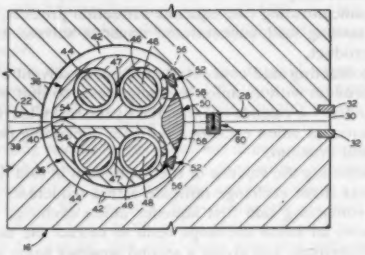
1. In a method for fabricating synthetic thermoplastic sheet material having differentially colored bands and striations of said bands therein extending along the length thereof, the steps comprising:

a. providing a die having a die chamber, a main inlet to said

chamber, an extrusion orifice and a discharge passage communicating between said die chamber and extrusion orifice, said die chamber being elongated relative to its depth in the direction perpendicular to the imaginary line drawn between said inlet and said discharge passage;

b. continuously supplying fluid synthetic thermoplastic resin to said inlet of said die chamber and causing said resin to flow through said die chamber to said discharge passage;

c. intermittently supplying a differentially colored fluid synthetic thermoplastic resin at a multiplicity of points in said die chamber spaced along the length thereof transversely of and within the flow of said first mentioned resin and between said inlet for said first mentioned fluid synthetic plastic resin and said discharge passage to produce a plurality of bands of said differentially colored resin at said spaced points within a matrix of said first mentioned resin flowing about said spaced points;



d. causing the composite stream of said bands within said maxtrix in said discharge passage to flow through the perforations of a perforated member and thereby provide fine striations in the bands of said differentially colored resin, said striations extending in the direction of flow of said composite stream towards said extrusion orifice; and

e. extruding a composite stream into a sheet-like structure wherein said differentially colored synthetic thermoplastic resin is encapsulated within a matrix of said first mentioned synthetic thermoplastic resin, said differentially colored synthetic plastic resin providing a plurality of striated bands of differential color along the length of the extruded composite stream with fine striations of said differential color extending longitudinally of the extruded composite stream.

4,011,293
TOUGHENED LINEAR AROMATIC POLYMERS

David M. Gale, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 21, 1973, Ser. No. 389,989
Int. Cl.² B27J *5/00*; D04H *1/54*
U.S. Cl. 264—126 **8 Claims**

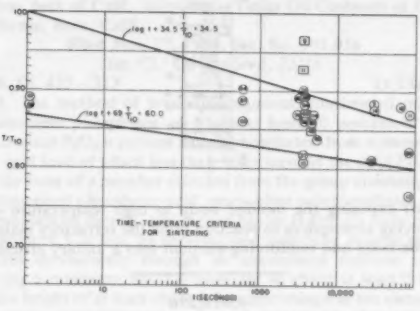
1. A method of preparing a toughened shaped article composed of polymer which comprises substantially linear, aromatic polymer selected from the group consisting of aromatic hydrocarbon polymers, aromatic halocarbon polymers and aromatic halohydrocarbon polymers, consists essentially of substantially heteroatomfree aromatic linkage along the polymer backbone, is thermally stable at 400° C as evidenced by a decomposition temperature above 400° C, is infusible at the decomposition temperature, and is insoluble in conventional solvents, said toughening method comprising compacting particles of said polymer into a shaped article, and sintering said shaped article under a time-temperature cycle such that, when T/T_{10} is plotted against t in the graph of the drawing, that point falls between the line representing the equation

$$\log t + 34.5\, T/T_{10} = 34.5$$

and the line representing the equation

$$\log t + 69\, T/T_{10} = 60$$

where t is the sintering time in seconds, T is the sintering

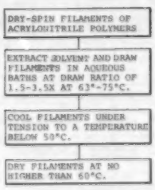


temperature in degrees Kelvin, and T_{10} is the decomposition temperature of the polymer in degrees Kelvin.

4,011,294
PROCESS FOR MAKING HIGH SHRINKAGE ACRYLIC FIBERS

Merton L. Davis, Camden, S.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 481,374, June 18, 1974, abandoned. This application June 20, 1975, Ser. No. 588,610
Int. Cl.² D01F *6/18*
U.S. Cl. 264—206 **3 Claims**


DRY-SPIN FILAMENTS OF ACRYLONITRILE POLYMERS
EXTRACT SOLVENT AND DRAW FILAMENTS IN AQUEOUS BATHS AT DRAW RATIO OF 1.5-3.5X AT 63°-75°C.
COOL FILAMENTS UNDER TENSION TO A TEMPERATURE BELOW 50°C.
DRY FILAMENTS AT NO HIGHER THAN 60°C.

1. In the process of preparing acrylic fibers wherein as-spun, dry-spun filaments of acrylonitrile polymers are extracted to remove solvent by passing the filaments continuously through aqueous baths, drawn between 1.5X and 3.5X during passage through the baths and thereafter dried; the improvement for preparing high shrinkage fibers having high shrinkage force which comprises passing the as-spun filaments through the aqueous baths in which they are drawn at bath temperatures of 63° to 75° C and then cooling the filaments while they are held under tension to a temperature of below 50° C and then drying the filaments at a temperature no higher than 60° C.

4,011,295
CERAMIC ROTOR FOR GAS TURBINE ENGINE

Dennis Jack Tree, Scottsdale, and F. Michael Tovey, Tempe, both of Ariz., assignors to The Garrett Corporation, Los Angeles, Calif.

Filed Oct. 7, 1974, Ser. No. 512,817
Int. Cl.² F01D *5/28*
U.S. Cl. 264—275 **8 Claims**

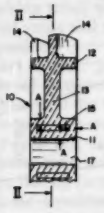
1. A method of forming a ceramic rotor for a gas turbine engine, comprising the steps of:

(a) hot pressing a quantity of refractory material to form a reinforcing element of predetermined shape;

(b) supporting said reinforcing element in a mold cavity conforming to the shape of the rotor desired;

(c) filling the cavity with pulverized refractory material to

mold the rotor body with the reinforcing element embedded therein; and



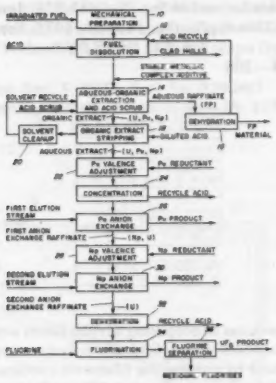
(d) exposing the molded body to high temperature in a reducing atmosphere to reaction bond the refractory material of the body and reinforcing element into a unitary article.

4,011,296

IRRADIATED FUEL REPROCESSING

Carl Phillip Ruiz, Fremont, and John Paul Peterson, Jr., Livermore, both of Calif., assignors to General Electric Company, San Jose, Calif.

Filed May 27, 1975, Ser. No. 581,138
Int. Cl.² C01G *43/00*
U.S. Cl. 423—4 **24 Claims**



1. In a process for treating irradiated nuclear fuel to recover uranium and at least one transuranic isotope selected from the group consisting of neptunium and plutonium so that said uranium and said at least one transuranic isotope are substantially free of fission products which comprises dissolving said fuel in a strong mineral acid and forming an aqueous dissolved nuclear fuel solution and subsequentially treating said dissolved solution to separate said uranium and said at least one transuranic isotope therefrom substantially free of said fission products, the improvement comprising adding to said solution prior to treatment for separation of said uranium and said transuranic isotope a sufficient amount of an additive of a non-radioactive [stable] metallic complex in which the metallic component is selected from the group consisting of niobium, tantalum and combinations thereof and said amount is sufficient to alter the decontamination factor exhibited by radioactive niobium in said solution.

13. A process for treating irradiated nuclear fuel contained in clad rods to recover separately uranium, neptunium, and plutonium therefrom substantially free of fission products, said process comprising the steps of

a. perforating the clad of the rods,

b. contacting the perforated rods with a strong mineral acid to dissolve the nuclear fuel and form an acid dissolver solution,

c. adding to said dissolver solution an additive of a nonradioactive metallic complex in an amount sufficient to alter the decontamination factor of radioactive niobium in said dissolver solution, said complex having the metallic component selected from the group consisting of niobium, tantalum and combinations thereof,

d. contacting said dissolver solution with an organic solvent to separate uranium, plutonium and neptunium into the organic solvent from said dissolver solution and leave an aqueous solvent extraction raffinate containing fission products,

e. contacting the organic solvent with a dilute mineral acid to strip the uranium, plutonium and neptunium from the organic solvent and from an aqueous extraction product,

f. adjusting the valence of plutonium and neptunium by contacting said aqueous solvent extraction product with a reductant,

g. concentrating said aqueous extraction product,

g. cooling said concentrated aqueous solvent extraction product,

i. contacting said concentrated aqueous solvent extraction product with an anion exchange resin so that plutonium in the +4 valence is extracted by the resin, leaving a first aqueous anion exchange raffinate containing neptunium and uranium,

j. adjusting the valence of the neptunium in said first aqueous anion exchange raffinate with a reductant,

k. contacting said first aqueous anion exchange raffinate with an anion exchange resin to extract the neptunium therefrom, and giving a second aqueous anion exchange raffinate,

l. dehydrating said second aqueous anion exchange raffinate to an anhydrous solid of uranium oxide, and

m. fluorinating the anhydrous solid to give uranium hexafluoride.

4,011,297

IN-SITU pH MEASUREMENT OF ORGANIC-CONTINUOUS SOLVENT EXTRACTION PROCESSES

Bror Göran Nyman, Pori; Raimo Juhani Leimala, Harjavalta, and Erik Gustav Bäck, Kokkola, all of Finland, assignors to Outokumpu Oy, Helsinki, Finland

Continuation-in-part of Ser. No. 362,731, May 22, 1973, abandoned. This application Apr. 1, 1975, Ser. No. 564,044
Claims priority, application Finland, June 2, 1972, 721565
Int. Cl.² C01G *3/00, 9/00, 53/00;* G01N *27/43*
U.S. Cl. 423—24 **11 Claims**

5. In an improved liquid-liquid extraction process for separating metals from each other, the steps of:

providing an organic solution of at least one extraction agent which releases hydrogen ions with a hydrocarbon or a mixture of hydrocarbons as a diluent;

mixing with said organic solution an aqueous solution containing metals to form a mixture consisting of an organic continuous phase and an aqueous dispersed phase;

measuring the pH by means of pH electrodes immersed in said mixture to determine the rate at which hydrogen ions are being released by said extraction agent;

controlling the pH of the aqueous dispersed phase by adding to said mixture a neutralizing agent, the rate of addition of said neutralizing agent being controlled in accordance with said pH measurement to maintain the pH of said aqueous dispersed phase substantially constant;

permitting the transfer of metals from said aqueous phase to said organic phase;

separating the said phases after the transfer of metals to said organic phase;

recovering metal values from said organic phase; and

regenerating said extraction agent.

8. The process of claim **5** wherein the metals to be separated

are two or more of zinc, cadmium, cobalt, nickel and copper and wherein the diluent is kerosene.

4,011,298

METHOD FOR SIMULTANEOUS REMOVAL OF SO_x AND NO_x

Suguru Fukui, Tokyo; Haruo Nishino, Kawasaki; Yohji Kameoka, Tokyo; Junichi Miyazaki, Fujisawa; Toshio Kuroda, Kawasaki, and Shinichi Konishi, Tokyo, all of Japan, assignors to Chiyoda Chemical Engineering & Construction Co. Ltd., Yokohama, Japan

Filed Dec. 16, 1974, Ser. No. 533,294

Claims priority, application Japan, Dec. 18, 1973, 48-140363

Int. Cl.² C01B *21/00*

U.S. Cl. 423—235 4 Claims

1. A method fo simultaneous removal of SO_x and NO_x from the waste gas containing said oxides, which method comprises the steps of:

A. adding an ozone-containing gas to said waste gas at temperatures between about 15° C and about 100° C to oxidize the NO_x so that the value x in NO_x in the waste gas is in the range of 1.2 to 2.5,

B. bringing said waste gas which has undergone treatment in step (A) into contact in a first zone with a solution containing sulfuric acid, nitric acid and ferric ion as a catalyst to remove SO_x and NO_x from said waste gas, said ferric ion content being in the range of from about 50 to 6,000 ppm by weight, and said nitric acid and sulfuric acid content being in the range of from about 0.05 to about 4% and from about 0.5 to about 10% respectively,

C. passing said solution resulting from step (B) from said first zone to a second zone,

D. introducing air or oxygen into the solution passed to said second zone in step (C) to effect oxidation of said SO_x and NO_x and activate the catalyst in said solution,

E. recycling the solution of the second zone into contact with waste gas in the first zone thereby establishing a circulation system between the first zone and second zone,

F. removing part of the solution from the circulation system, and

G. supplying make up water and make up catalyst to said circulation system.

4,011,299

PROCESS FOR REMOVING SULFUR DIOXIDE AND NITROGEN OXIDES FROM GASES

Jay M. Henis, and Mary K. Tripodi, both of Creve Coeur, Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Oct. 1, 1975, Ser. No. 618,729

Int. Cl.² B01D *53/00*

U.S. Cl. 423—239 11 Claims

1. A process for removing sulfur dioxide and nitrogen oxides from stack gases containing the same which process comprises contacting such gases at a convenient space velocity and at temperatures in excess of about 700° C with a solid reagent consisting essentially of calcium oxide, magnesium oxide or compounds convertible thereto under the reaction conditions, or mixtures thereof in the presence of an excess of reducing gas comprising carbon monoxide, hydrogen, or mixtures thereof, with the solid reagent, by replenishing as necessary, being maintained in sufficient stoichiometric excess of the sulfur dioxide and other oxidants in the gases being treated to induce the formation of the corresponding sulfide of the alkaline earth metal component of the solid reagent.

4,011,300

METHOD OF PRODUCING AMMONIUM POLYPHOSPHATE

Bruce A. Harbolt, Northridge, and Donald C. Young, Fullerton, both of Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed June 27, 1975, Ser. No. 591,056

Int. Cl.² C01B *15/16, 25/26*

U.S. Cl. 423—313 11 Claims

1. The method of producing aqueous solutions of mixed ammonium phosphates, of which at least 40 percent of the equivalent P_2O_5 is present as polyphosphates, from a phosphoric acid feed of which less than 40 percent of the total P_2O_5 is in the form of a member selected from the group consisting of polymerized phosphoric acid, ammonium polyphosphates and combinations thereof, which feed has an H_2O/P_2O_5 mole ratio of about 4.5 or less, by spraying said acid from an acid spray means downwardly through an unconfined reaction zone having a minimum internal diameter of about at least 2 feet and a height of at least about 2 feet determined as the distance between said acid spray means and the upper surface of said aqueous quench and into a liquid phase, aqueous quench under conditions sufficient to produce a dispersed liquid acid spray, jetting ammonia radially inwardly into said acid spray in said unconfined reaction zone around the full periphery of said acid spray in a direction and at a velocity having an inward radial vector of at least about 200 feet per second and a mass flow rate of at least about 0.12 weight parts ammonia per weight part acid determined as P_2O_5 and further dispersing said acid phase into discontinuous small liquid droplets, surrounding said acid droplets with said ammonia, and reacting said ammonia with said acid to adiabatically heat the unconfined acid droplets to a temperature within the range of about 500° to about 750° F. by the autogenous heat of reaction, increase the polymeric P_2O_5 content by an amount corresponding to at least about 10 percent of the total P_2O_5 present, and convert said acid to an ammoniated, polymerized melt, of which at least about 40 percent of the phosphate determined as P_2O_5 is present as ammonium polyphosphates, within less than about 5 feet of said acid spray means and before said acid spray contents said aqueous quench, and quenching said melt to a temperature of less than about 200° F. by immersion in said aqueous quench.

4,011,301

AMMONIUM PHOSPHATE PRODUCTION AND THE REDUCTION OF FLUORINE AND SILICON EMISSIONS

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

Filed Oct. 23, 1975, Ser. No. 625,166

Int. Cl.² C01B *15/16, 25/26;* B01D *19/00*

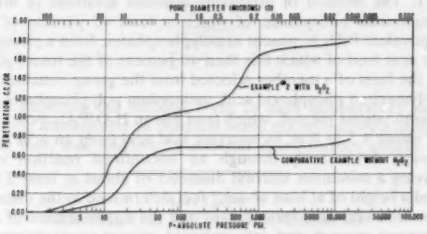
U.S. Cl. 423—313 9 Claims

1. The method of converting wet-process phosphoric acid containing silicon and fluorine as soluble compounds thereof to ammonium phosphates and reducing the emission of said compounds to the atmosphere, including the steps of (a) heating said wet-process acid feed to a temperature of at least about 120° C. sufficient to vaporize a portion of the water from said acid, concentrate said acid and form a vapor phase containing vaporized water and a portion of said silicon and fluorine; (b) separating said vapor phase from the concentrated acid, (c) maintaining said vapor phase at a temperature of at least about 50° C. until said vapor phase is contacted with the ammonium phosphate solution hereinafter defined; (d) at least partially neutralizing at least 5 percent of said concentrated acid with ammonia to form said ammonium phosphates; and (e) contacting said vapor phase with said ammonium phosphates in the liquid phase at a liquid phase temperature below about 110° C., a vapor phase temperature of at least about 50° C., and a pH of at least 5.5, and absorbing said vapor phase in said ammonium phosphate solution.

4,011,302
PROCESS FOR PREPARING HIGHLY ABSORBENT, LOW BULK DENSITY SODIUM SILICATE

Mohamed Defrawi, Memphis, Tenn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 26, 1975, Ser. No. 590,494
Int. Cl.² C01B *33/32*
U.S. Cl. 423—332 **7 Claims**

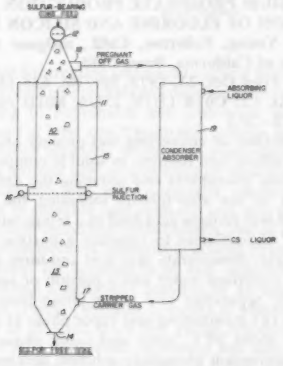


1. A process for the preparation of a water-soluble, highly absorbent, sodium or potassium silicate comprising mixing an aqueous alkali metal silicate selected from sodium silicate and potassium silicate having a mole ratio of silica to sodium or potassium oxide of from 2:1 to 3.5:1 with a 20 to 100% by weight hydrogen peroxide aqueous solution to form a mixture with a viscosity sufficiently low to pass through the spray dryer nozzle without preheating and spray drying the mixture having a 5 to 20% by weight hydrogen peroxide content based on the weight of alkali metal silicate at a temperature of from about 450° to about 800° F and collecting a sodium or potassium silicate product having a water content of from 12 to 22% by weight, a bulk density of 0.1 g/cc to 0.3 g/cc and an absorbency of 50 to 200% based on the OSB test.

4,011,303
PROCESS FOR DESULFURIZING SULFUR-BEARING COKE

Douglas MacGregor, Salt Lake City, Utah, assignor to William H. Sayler, Salt Lake City, Utah, a part interest

Continuation of Ser. No. 541,001, Jan. 14, 1975, abandoned. This application Nov. 12, 1975, Ser. No. 630,960
Int. Cl.² C01B *31/02*, *31/26*
U.S. Cl. 423—461 **6 Claims**



1. A process of desulfurizing sulfur-bearing coke, comprising the steps of heating a sulfur-bearing coke; passing a diluted elemental sulfur vapor through the heated coke, the temperature of the coke being such that said sulfur vapor will react with the sulfur compounds and complexes in the combustible portion of the coke to form carbon disulfide, which reaction thereby removes sulfur values originally carried by the combustible portion of said coke; controlling the reaction time so that the reaction will not continue substantially beyond the time that sulfur values originally carried by the combustible portion of said coke have been consumed; controlling the reaction environment so that the sulfur vapor is the only active element present and recovering the desulfurized coke.

4,011,304
METHOD FOR CONTROLLING REMOVAL OF HYDROGEN SULFIDE FROM GASES

Robert A. Mancini, Elk Grove Village, and David M. Cyr, Lombard, both of Ill., assignors to Air Resources, Inc., Palatine, Ill.

Filed Mar. 5, 1975, Ser. No. 555,570
Int. Cl.² C01B *17/04*
U.S. Cl. 423—573 G **9 Claims**

1. In a process for the removal of hydrogen sulfide from a gas in an oxidation-reduction system by contacting the gas with a chelated iron solution comprising an aqueous solution of iron complexed with at least one chelating agent, whereby iron in the ferric state oxidizes the hydrogen sulfide to elemental sulfur and is reduced to the ferrous state, separating sulfur from said solution, and regenerating said solution by aeration to oxidize the iron to the ferric state; the improved method of regulating the redox potential of the solution in the system to obtain a hydrogen sulfide removal efficiency of at least about 85%, which comprises:

a. effecting addition for fresh chelated iron solution to the system and withdrawal of used solution from the system so as to increase the ratio of ferric ions to ferrous ions and thereby increase the redox potential of the solution in the system;
b. maintaining a substantially constant volume of solution in the system;
c. maintaining substantially the maximum rate of aeration of the solution;
d. measuring the redox potential of the solution in the system by means of a redox electrode; and
e. controlling said addition of fresh solution and said withdrawal of used solution to maintain said redox potential of the solution in the system at not less than a predetermined minimum required to maintain the activity of the solution.

4,011,305
PROCESS FOR OBTAINING HYDROGEN AND OXYGEN FROM WATER

Rudolf Schulten, Richterich, and Karl Friedrich Knoche, Aachen, both of Germany, assignors to Rheinische Braunkohlenwerke AG, Cologne, Germany

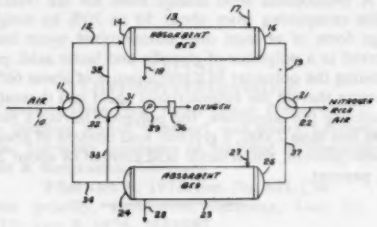
Filed Oct. 4, 1974, Ser. No. 512,797
Int. Cl.² C01B *13/02*
U.S. Cl. 423—579 **5 Claims**

1. A process for the dissociation of water into hydrogen and oxygen in a multi-stage closed cycle process using an iron/chlorine system, characterized in that a first material bed containing iron(II)chloride is subjected to a mixture of steam and hydrogen converting the iron(II)chloride to a mixture of iron(II)oxide and iron, said latter mixture is subjected in said first bed to steam to produce iron(II,III)oxide accompanied by the liberation of hydrogen, and said iron(II,III)oxide is then subjected in said first bed to hydrogen chloride to convert it back to iron(II)chloride with the liberation of oxygen.

4,011,306
OXYGEN GENERATION METHOD

William B. Fox, Jr., West Carrollton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 26, 1976, Ser. No. 661,581
Int. Cl.² C01B 13/02
U.S. Cl. 423—579 9 Claims



1. In a method of generating oxygen wherein bis(3-fluorosalicylal)ethylenediimine cobalt (II) is used as the oxygen absorbent and during absorption and desorption of oxygen volatilizable inert materials form in the absorbent and occupy oxygen sites, the improvement which comprises heating the oxygen absorbent containing volatilizable inert materials in a heating zone at a temperature ranging from about 340° to 390° F for a period of about 15 to 30 minutes, thereby volatilizing the inert materials; and continuously removing volatilized inert materials from the heating zone during the heating period.

4,011,307
PRODUCTION OF ^{203}Pb-TRIS-HYDROXYMETHYL AMINO METHANE

Richard M. Lambrecht, East Quogue; Samuel Packer, Manhasset, both of N.Y.; Jerald C. Merrill, Salt Lake City, Utah; Harold L. Atkins; Alfred P. Wolf, both of Setauket, N.Y., and Patrick R. Bradley-Moore, New York, N.Y., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed June 3, 1976, Ser. No. 692,625
Int. Cl.² A61K 29/00, 43/00; G01T 1/161; G21H 5/02
U.S. Cl. 424—1 5 Claims

1. The method of preparing carrier-free ^{203}Pb-lead tris-hydroxymethyl amino methane comprising the steps of:

a. exposing a target consisting of naturally occurring thallium to a beam of deuterons of at least about 11 MeV but not in excess of 22.7 MeV energy, said target being of sufficient thickness along the path of said beam so as to cause said beam to be degraded down to about 11 MeV in the thallium, for a sufficient length of time to produce lead-203 by the reaction ^{203}Tl $(d, 2n)$ ^{203}Pb;

b. dissolving said target;

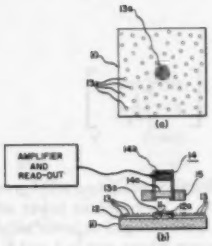
c. chemically separating said ^{203}Pb in the form of ^{203}Pb-nitrate from the dissolved target; and

d. dissolving the ^{203}Pb-nitrate in an aqueous solution of tris-hydroxymethyl amino methane, the latter being supplied in sufficient amount to adjust the solution to a pH in the range of about 6.8 to 7.2.

4,011,308
METHOD FOR SURFACE IMMUNOLOGICAL DETECTION OF BIOLOGICAL PARTICLES BY THE USE OF TAGGED ANTIBODIES

Ivar Giaever, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 430,884, Jan. 4, 1974, abandoned. This application Mar. 24, 1976, Ser. No. 670,043
Int. Cl.² G01N 23/00, 33/16
U.S. Cl. 424—1.5 29 Claims



1. A method for determining the presence or absence of select biological particles in a liquid sample comprising the steps of:

contacting a portion of the surface area of a substrate with first biological particles specific to the select biological particles, said first biological particles being dispersed as a first single layer coating said portion of said surface area in the form of a preselected pattern;

contacting at least the coated surface area of said substrate with the sample liquid for a preselected period of time;

applying a liquid medium to the coated surface area resulting from the preceding step;

said liquid medium containing tagged biological particles specific to the select biological particles, the tags for said tagged biological particles being detectable by determining the presence of emanations therefrom and

monitoring the level of tag emanations over said surfacc area to determine whether said level is significantly greater over said preselected partern than over the balance of said surface area.

4,011,309
DENTIFRICE COMPOSITION AND METHOD FOR DESENSITIZING SENSITIVE TEETH

Herman J. Lutz, Hatboro, Pa., assignor to Marion Laboratories, Inc., Kansas City, Mo.

Continuation-in-part of Ser. No. 542,520, Jan. 20, 1975, abandoned. This application Jan. 14, 1976, Ser. No. 648,977
Int. Cl.² A61K 7/16
U.S. Cl. 424—49 4 Claims

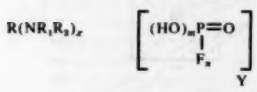
1. A tooth desensitizing dentifrice composition in the form of an aqueous gel comprising from about 0.1 to about 3 percent by weight of citric acid, from about 0.3 to about 9 percent of sodium citrate, from about 19 to about 25 percent of a normally-solid, water-soluble condensation product of ethylene oxide and polypropylene glycol, said condensation product having a molecular weight of about 8,000 to about 14,000, and a polyoxyethylene content of from about 65 to about 80 percent by weight, and water.

4,011,310
DENTAL PROPHYLAXIS CONTAINING ALKYLAMINE FLUOROPHOSPHATES

Gianluigi Soldati, Mercerville; Ralph G. Eilberg, Cranbury; Helga Melger, Willingboro, all of N.J., and David A. Schlichting, Pound Ridge, N.Y., assignors to Carter-Wallace, Inc., New York, N.Y.

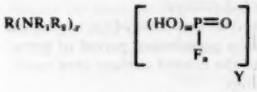
Filed Oct. 20, 1975, Ser. No. 624,775
Int. Cl.² A61K 7/18
U.S. Cl. 424—52 16 Claims

1. Alkylamine fluorophosphates of the formula:



wherein R is a linear or branched alkyl group containing 1–20 carbon atoms, R_1 is hydrogen or lower alkyl containing 1–6 carbon atoms, R_2 is hydrogen or lower alkyl, x is 1 or 2, m and n are whole integers whose sum is 3 and Y is 1 when x=1 and 1 or 2 when x=2; when R, R_1 and R_2 are lower alkyl they can be substituted with an hydroxy group.

6. A dental prophylaxis comprising a vehicle and an alkylamine fluorophosphate of the formula:



wherein R is a linear or branched alkyl group containing 1–20 carbon atoms, R_1 is a lower alkyl of 1–6 carbon atoms or hydrogen R_2 is hydrogen or lower alkyl, x is 1 or 2, Y is 1 when x is 1, Y is 1 or 2 when x=2, and m and n are whole positive integers whose sum is 3. When R, R_1 and R_2 represent a lower alkyl they can be substituted with an hydroxy group.

4,011,311
APPLICATOR STICK

Arie Noomen, Voorhout, and Pieter H. J. Schuurink, Noordwijk, both of Netherlands, assignors to Akzo N.V., Arnhem, Netherlands

Filed Apr. 18, 1974, Ser. No. 461,966
Claims priority, application Netherlands, Apr. 24, 1973, 7305664
Int. Cl.² A61K 7/32
U.S. Cl. 424—65 18 Claims

1. A shaped gel applicator containing a water dispersible material to be applied to a surface by rubbing the gel over the surface which comprises

a. 5% to 40% by weight of a gel which is the reaction product of an aromatic diisocyanate having 8 to 30 carbon atoms, the isocyanate groups of the diisocyanate being bonded directly to an aromatic ring, with a mono- alkanolamine or dialkanolamine having 2 to 16 carbon atoms;
b. 10% to 90% by weight of water or a water and water miscible organic solvent mixture; and
c. 0.01% to 45% by weight of said material to be applied to the surface. all percentages by weight being calculated on the sum of the three aforementioned components.

4,011,312
PROLONGED RELEASE DRUG FORM FOR THE TREATMENT OF BOVINE MASTITIS

Gerald L. Reuter, and Andrew G. Tsuk, both of Plattsburgh, N.Y., assignors to American Home Products Corporation, New York, N.Y.

Filed June 25, 1975, Ser. No. 590,358
Int. Cl.² A61K 31/765, 35/66
U.S. Cl. 424—78 3 Claims

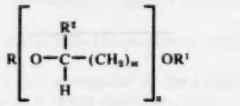
1. A bioerodable solid dosage form for the treatment of mastitis comprising from about 30 to 70% by weight of a dosage form of at least one antimicrobial agent intimately dispersed in a polyester of glycolic and lactic acid, prepared by heating the polyester to a temperature of about 60°–80° C, dispersing therein the antimicrobial agent and thereafter rapidly cooling the admixture, the polyester having a molecular weight less than 2,000, a glycolic acid content of about 60 to 80 mole percent, and a lactic acid content of about 20 to 40 mole percent.

4,011,313
MEDICAMENT PREPARATIONS

Geoffrey F. Thompson, Sunnyvale, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

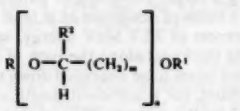
Continuation of Ser. No. 477,227, June 7, 1974, abandoned, which is a continuation-in-part of Ser. No. 313,431, Dec. 8, 1972, Pat. No. 3,833,725, and Ser. No. 413,965, Nov. 8, 1973, abandoned. This application Oct. 17, 1975, Ser. No. 623,871
The portion of the term of this patent subsequent to May 13, 1992, has been disclaimed.
Int. Cl.² A61K 31/08, 31/65
U.S. Cl. 424—227 23 Claims

1. A stabilized, antibiotic composition comprising a major amount of at least one dialkylated mono- or poly-alkylene glycol having the formula:



where R and R^1 are independently lower alkyl having 1 to 6 carbon atoms, R^2 is hydrogen or lower alkyl having 1 to 6 carbon atoms, m is an integer from 1 to 6, and n is an integer from 1 to a very large number such that the molecular weight of said dialkylated glycol is up to about 20,000 and a pharmaceutically effective amount of a tetracycline or a pharmaceutically acceptable salt thereof, said composition containing a minimum amount of water, up to about 5%, and being substantially devoid of peroxides and other oxidation products in quantities which interfere with the carrier or stabilizing properties of said composition.

20. The method of controlling acne which comprises topically applying to an acne affected skin area a composition comprising a major amount of a dialkylated mono- or polyalkylene glycol, having the formula:



where R and R^1 are independently lower alkyl having 1 to 6 carbon atoms, R^2 is a hydrogen or lower alkyl having 1 to 6 carbon atoms, m is an integer from 1 to 6, and n is an integer from 1 to a very large number such that the molecular weight of said dialkylated glycol is up to about 20,000; an acne controlling amount of a tetracycline; and a minor amount of at

least one antioxidant for said dialkylated glycol material, said composition containing a minimum amount of water, up to about 5%, and being substantially devoid of peroxides and other oxidation products in the quantities which interfere with the carrier or stabilizing properties of said glycol material.

4,011,314
7-HYDROXYESTRADIOLS

Karl Petzoldt; Hans-Jörg Vidic; Klaus Prezewowsky; Yukishige Nishino; Rudolf Wiechert, and Henry Laurent, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

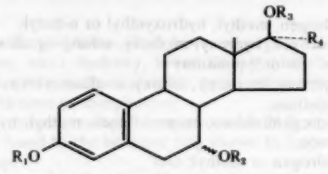
Filed Oct. 9, 1975, Ser. No. 621,136

Claims priority, application Germany, Oct. 14, 1974, 2449327; Aug. 8, 1975, 2535597

Int. Cl.² A61K *31/58*; C07J *1/00*

U.S. Cl. 424—241 **28 Claims**

1. A hydroxyestradiol of the formula

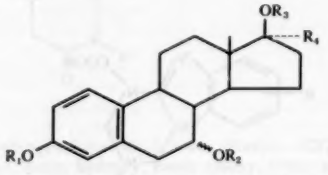


wherein R_1 is a hydrogen atom, the acyl radical of a hydrocarbon carboxylic or sulfonic acid of 1–15 carbon atoms, alkyl of 1–8 carbon atoms, cycloalkyl of 3–7 carbon atoms, tetrahydrofuranyl or tetrahydropyranyl;

R_2 and R_3 each are a hydrogen atom, the acyl radical of a hydrocarbon carboxylic or sulfonic acid of 1–15 carbon atoms, tetrahydrofuranyl or tetrahydropyranyl; and

R_4 is alkenyl, chloroalkenyl, alkynyl or chloroalkynyl, each of up to 5 carbon atoms.

28. A method of treating estrogen deficiency syndromes in a female mammal which comprises the enteral or parenteral administration of an amount effective to ameliorate symptoms of estrogen deficiency in the female mammal of a hydroxyestradiol of the formula.



wherein R_1 is a hydrogen atom, the acyl radical of a hydrocarbon carboxylic or sulfonic acid of 1–15 carbon atoms, alkyl of 1–8 carbon atoms, cycloalkyl of 3–7 carbon atoms, tetrahydrofuranyl or tetrahydropyranyl; R_2 and R_3 each are a hydrogen atom, the acyl radical of a hydrocarbon carboxylic or sulfonic acid of 1–15 carbon atoms, tetrahydrofuranyl or tetrahydropyranyl and R_4 is alky, alkenyl, chloroalkenyl, alkynyl or chloroalkynyl, each of up to 5 carbon atoms.

4,011,315
21-ACETALS AND MIXED ACETALS OF STEROIDAL 21-ALDEHYDES, INTERMEDIATES AND METHODS OF PREPARATION

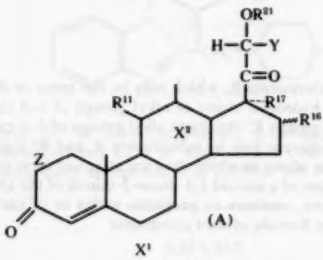
Michael Marx, Sunnyvale, and Denis John Kertesz, Menlo Park, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed July 7, 1975, Ser. No. 593,903

Int. Cl.² C07J *5/00*

U.S. Cl. 424—241 **29 Claims**

1. A compound having the formula:



wherein:

R^{11} is chloro or hydroxy;

R^{16} independently is methyl;

R^{17} independently is hydroxy or acyloxy having 2 to 8 carbon atoms or R^{16} and R^{17} taken together are 16α,17α-isopropylidenedioxy;

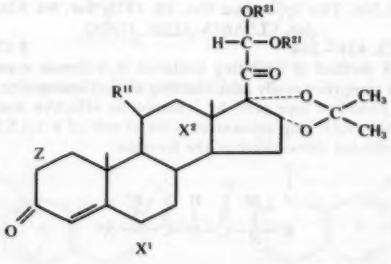
R^{21} is lower alkyl having 1 to 8 carbon atoms;

X^1 and X^2 are independently hydrogen, chloro or fluoro, with the proviso that when R^{11} is chloro, X^2 is chloro;

Y is OR^{21}, $Sr^{21'}$, bromo, chloro, cyano, thiocyano or azido in which $R^{21'}$ is lower alkyl having 1 to 8 carbon atoms or phenyl and R^{21} is as defined above but independent thereof with the proviso that when Y is OR^{21}, R^{16} and R^{17} are 16α,17α-isopropylidenedioxy; and

Z is a single or double bond.

29. A method for relieving symptoms associated with inflammatory disorders comprising administering an effective amount of a compound having the formula



wherein:

R^{11} is chloro or hydroxy;

both R^{21} groups are identical lower alkyls containing 1 to 8 carbon atoms;

X^1 and X^2 are independently hydrogen, chloro or fluoro with the proviso that when R^{11} is chloro, X^2 is chloro; and

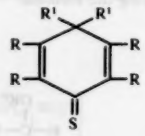
Z is a single or double bond; or a pharmaceutical composition containing same.

4,011,316
CYCLOHEXA-2,5-DIENE-1-THIONES

Derek Harold Richard Barton, London, England, assignor to Research Institute for Medicine and Chemistry Inc., Cambridge, Mass.

Filed Feb. 24, 1975, Ser. No. 552,345
Int. Cl.² A61K *31/58*
U.S. Cl. 424—241 **22 Claims**

1. A compound of the general formula



wherein the substituents R, which may be the same or different, represent hydrogen atoms or alkyl groups of 1–6 carbon atoms and the groups R^1 represent alkyl groups of 1–6 carbon atoms or an adjacent pair of substituents R and R^1 together with the carbon atoms to which they are attached form part of the ring structure of a steroid 1,4-diene-3-thione of the cholestane, androstane, oestrane or pregnane series or of santonin 3-thione; or an S-oxide of said compound.

4,011,317
STEROID DERIVATIVES

Aldo Bertelli, Milan, Italy, assignor to Rorer Italiana S.p.A., Milan, Italy

Filed Aug. 22, 1975, Ser. No. 607,042
Int. Cl.² A61K *31/56*
U.S. Cl. 424—243 **5 Claims**

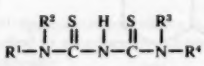
1. 11β,17,21-trihydroxypregna-1,4-diene-3,20-dione 21-(4-N-acetyl-aminomethylcyclohexanecarboxylate).

4,011,318
METAL SALTS OF 1,1,5,5-TETRASUBSTITUTED DITHIOBIURETS AS POPULATION CONTROL AGENTS

William R. Diveley, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Division of Ser. No. 359,164, May 10, 1973, Pat. No. 3,950,366. This application Oct. 28, 1975, Ser. No. 626,525
Int. Cl.² A61K *31/04, 31/095*
U.S. Cl. 424—244 **5 Claims**

1. A method of inhibiting ovulation in a female mammal, which comprises orally administering to that mammal at least for a period of time prior to ovulation an effective nontoxic ovulation inhibiting amount of a metal salt of a 1,1,5,5-tetrasubstituted dithiobiuret of the formula:



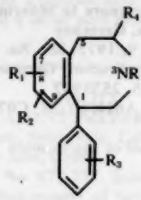
in which R^1, R^2, R^3 and R^4, when taken independently of each other, are selected from the group consisting of C_1–C_{18} alkyl, C_6–C_{12} aryl, C_5–C_{12} cycloalkyl and these radicals substituted by at least one member of the group consisting of hydroxyl, C_1–C_4 alkyl, C_1–C_8 acyl, halo and nitro, and R^1 and R^2 when taken together with the nitrogen to which they are bonded, and R^3 and R^4 when taken together with the nitrogen to which they are bonded are selected from the group consisting of N-morpholinyl, N-piperidyl, N-pyrrolidyl, and N-aziridinyl.

4,011,319
PHARMACEUTICAL COMPOSITIONS AND METHODS INVOLVING BENZAZEPINE DERIVATIVES

Carl Kaiser, Haddon Heights, N.J., and Robert G. Pendleton, Philadelphia, Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed July 2, 1975, Ser. No. 592,708
Int. Cl.² A61K *31/33*
U.S. Cl. 424—244 **13 Claims**

1. A method of stimulating peripheral dopamine receptors in an animal requiring stimulation of said peripheral dopamine receptors which comprises administering internally to said animal a nontoxic amount sufficient to stimulate said peripheral dopamine receptors of a compound of the formula:



in which:

R is hydrogen, methyl, hydroxyethyl or n-butyl;

R_1 is hydrogen, hydroxy, methoxy, ethoxy or alkanoyloxy, in the 7-, 8- or 9-position;

R_2 is hydroxy, methoxy, ethoxy or alkanoyloxy, in the 8- or 9-position;

R_3 is hydrogen, chloro, bromo, fluoro, methyl, hydroxy or methoxy;

R_4 is hydrogen or methyl; and

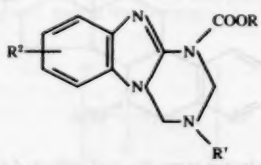
said alkanoyl moieties have from 2 to 5 carbon atoms, or a pharmaceutically acceptable acid addition or quaternary salt of said compound.

4,011,320
7(8)-SUBSTITUTED TRIAZINOBENZIMIDAZOLES AND ANTHELMINTIC COMPOSITIONS AND METHOD

Colin C. Beard, Palo Alto; John A. Edwards, Los Altos, and John H. Fried, Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 589,237, June 23, 1975, abandoned. This application Mar. 8, 1976, Ser. No. 664,454
Int. Cl.² C07D *251/72*
U.S. Cl. 424—249 **31 Claims**

1. A compound selected from the group of compounds represented by the formula:



(I)

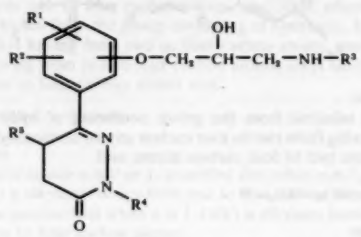
where R is a lower alkyl group having 1 to 4 carbon atoms; R′ is diloweralkylaminoalkyl (C_{2-6}) or alkyl having 1 to 18 carbon atoms; R^2 is phenylsulfinyl, phenoxyethoxy, benzyloxyethoxy, methoxyethylsulfinyl, or 3-chloroprop-1-ylsulfinyl; the R^2-substitution being at the 7(8)-position; or a pharmaceutically acceptable salt thereof.

4,011,321
PHARMACEUTICAL COMPOSITIONS AND METHODS OF INHIBITING β-ADRENERGIC RECEPTORS

William John Coates, Welwyn Garden City; Anthony Maitland Roe, Hatfield, and Robert Antony Slater, Letchworth, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Division of Ser. No. 531,957, Dec. 12, 1974, Pat. No. 3,931,177. This application Sept. 15, 1975, Ser. No. 613,601
Int. Cl.² A61K *31/495*
U.S. Cl. 424—250 11 Claims

1. A pharmaceutical composition having β-adrenergic blocking activity comprising in an effective amount to produce said activity a pyridazinone compound of the formula:



wherein

R^1 is hydrogen, lower alkyl, lower alkenyl, $-CF_3$, halogen, cyano, nitro, hydroxy, lower alkoxy, lower alkenyloxy, amino, lower alkanoylamino, lower alkylamino, di lower alkylamino or morpholino;

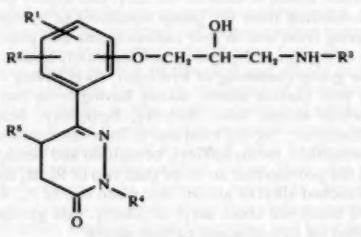
R^2 is hydrogen, methyl, or together with R^1 forms a benzene ring fused to the benzene ring shown to form a naphthyl group;

R^3 is isopropyl or tertiary butyl; and

R^4 and R^5, which may be the same or different, are hydrogen or methyl;

or a pharmaceutically acceptable acid addition salt thereof in combination with a pharmaceutically acceptable diluent or carrier.

2. A method of inhibiting β-adrenergic receptors which comprises administering internally to an animal in need thereof in an amount sufficient to block said receptors a pyridazinone compound of the formula:



wherein

R^1 is hydrogen, lower alkyl, lower alkenyl, $-CF_3$, halogen, cyano, nitro, hydroxy, lower alkoxy, lower alkenyloxy, amino, lower alkanoylamino, lower alkylamino, di lower alkylamino or morpholino;

R^2 is hydrogen, methyl, or together with R^1 forms a benzene ring fused to the benzene ring shown to form a naphthyl group;

R^3 is isopropyl or tertiary butyl; and

R^4 and R^5, which may be the same or different, are hydrogen or methyl;

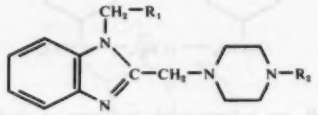
or a pharmaceutically acceptable acid addition salt thereof.

4,011,322
BENZIMIDAZOLE DERIVATIVES AND PROCESS FOR THE PRODUCTION THEREOF

Dieter Rahtz; Hans Wendt, and Henning Koch, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Filed July 28, 1975, Ser. No. 599,398
Claims priority, application Germany, July 29, 1974, 2436883
Int. Cl.² C07D *403/06*
U.S. Cl. 424—250 8 Claims

1. A benzimidazole derivative of the formula



wherein R_1 is o-hydroxyphenyl, p-chlorophenyl, or p-fluorophenyl, and R_2 is an alkyl of 2–4 carbon atoms, or a physiologically acceptable acid addition salt thereof.

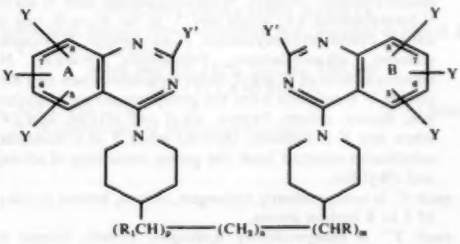
4,011,323
BI-4-[1-(QUINAZOLINYL-4)PIPERIDYLS] AND BIS 4-[1-(QUINAZOLINYL-4)PIPERIDYL]ALKANES

William R. J. Simpson, Mendham, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 451,977, March 18, 1974, abandoned, which is a continuation-in-part of Ser. No. 291,652, Sept. 25, 1972, abandoned. This application June 18, 1975, Ser. No. 588,003
Int. Cl.² C07D *401/14*
U.S. Cl. 424—251 52 Claims

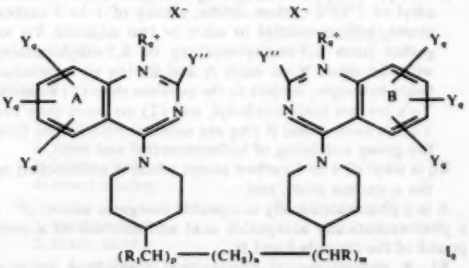
1. A compound selected from the group consisting of:

a. compounds of the formula I:



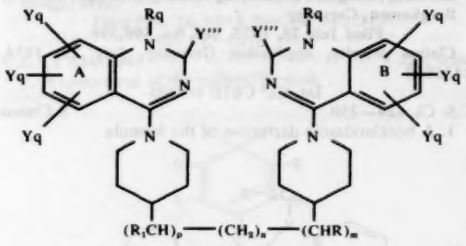
I

b. compounds of the formula Iq:



I_q

and c. compounds of the formula Ir:



Ir

wherein

R and R_1 are independently hydrogen or alkyl of 1 to 4 carbon atoms,

n is 0 to 4,

m is 0 to 1,

p is 0 or 1,

each Y is independently hydrogen, fluoro, chloro, bromo, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 3 carbon atoms, alkylthio of 1 to 3 carbon atoms, hydroxy, formamido, trifluoromethyl, nitro, cyano, amino, hydroxylamino, N-monoalkylamino of 1 to 4 carbon atoms, N,N-dialkylamino in which each alkyl is of 1 to 3 carbon atoms, alkanoylamino of 2 to 4 carbon atoms, N-alkyl (of 1 to 3 carbon atoms), N-alkanoyl (of 2 to 4 carbon atoms) amino or N-alkyl (of 1 to 3 carbon atoms), N-formylamino or two adjacent Y together form 6,7-methylenedioxy or 6,7-ethylenedioxy (with the other Y on each A and B ring so substituted being hydrogen), subject to the proviso that: (1) adjacent Ys are not both tert-butyl; (2) no more than 2 Ys in each A and B ring are substituents selected from the group consisting of trifluoromethyl, nitro, cyano, hydroxy, formamido, alkylthio, amino, N-alkylamino, N,N-dialkylamino, hydroxylamino, alkanoylamino, N-alkyl, N-alkanoylamino and N-alkyl, N-formylamino; (3) when any Y in an A or B ring is amino, cyano, hydroxylamino, N-alkylamino, N,N-dialkylamino, alkanoylamino, formamido, N-alkyl, N-alkanoylamino or N-alkyl, N-formylamino, then any dissimilar Y is selected from the group consisting of hydrogen, fluoro, chloro, bromo, alkyl and alkoxy; and (4) when any Y is hydroxy, then no other Y is a dissimilar substituent selected from the group consisting of alkoxy and alkylthio,

each Y′ is independently hydrogen, chloro, bromo or alkyl of 1 to 4 carbon atoms,

each Y″ is independently hydrogen, chloro, bromo or straight chain alkyl of 1 to 4 carbon atoms,

each Y‴ is independently hydrogen or straight chain alkyl of 1 to 4 carbon atoms,

each Y_q is independently hydrogen, fluoro, chloro, bromo, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 3 carbon atoms, trifluoromethyl or nitro or two adjacent Yq together form 6,7-methylenedioxy or 6,7-ethylenedioxy with the other Y on each A and B ring so substituted being hydrogen, subject to the provisos that: (1) adjacent Yq's are not both tert-butyl; and (2) no more than two Yq's in each A and B ring are substituents selected from the group consisting of trifluoromethyl and nitro,

Rq is alkyl of 1 to 4 carbon atoms which is unbranched on the α-carbon atom, and

X is a pharmaceutically acceptable inorganic anion, or a pharmaceutically acceptable acid addition salt of a compound of the formula I and Ir.

51. A pharmaceutical composition comprising an inert pharmaceutically acceptable carrier and 3 to 500 milligrams of a compound of claim **1.**

4,011,324

ESTERS AND AMIDES OF PYRIMIDO[4,5-b]QUINOLIN-4(3H)-ONE-2-CARBOXYLIC ACIDS AS ANTIULCER AGENTS

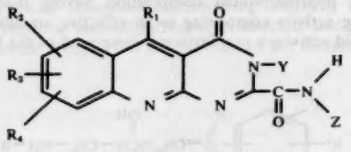
Thomas H. Althuis, Groton, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Jan. 20, 1976, Ser. No. 650,714

Int. Cl.[2] C07D *471/04;* **260** *256.4 F;256.5 R*

U.S. Cl. 424—251 **27 Claims**

1. A compound of the formula



wherein

Z is selected from the group consisting of hydroxyalkyl having from two to four carbon atoms, aminoalkyl having from two to four carbon atoms; and

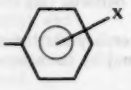
$$-(alk)_m-(O)_n-W$$

wherein

each of *m* and *n* is 0 or 1, provided that when *n* is 1, *m* is 1;

(alk) is alkylene having from one to four carbon atoms, provided that when *n* is 1, (alk) is alkylene having from two to four carbon atoms;

W is selected from the group consisting of pyridyl, imidazolyl and



wherein X is selected from the group consisting of hydrogen, amino, carboxy, hydroxy, alkyl having from one to four carbon atoms and alkoxy having from one to four carbon atoms;

Y is selected from the group consisting of hydrogen, methyl, carboxyalkyl having from one to four carbon atoms in the alkyl group and carbalkoxyalkyl having from one to four carbon atoms in each of the alkyl and alkoxy groups;

R_1 is selected from the group consisting of hyrogen, alkyl having from one to four carbon atoms and phenyl;

each of R_2, R_3 and R_4 when taken separately is selected from the group consisting of hydrogen, alkyl having from one to four carbon atoms, alkoxy having from one to four carbon atoms, halo, hydroxy, benzyloxy, benzoyloxy, alkanoyloxy having from one to four carbon atoms, thiol, methylthio, methylsulfinyl, benzylthio and benzylsulfinyl;

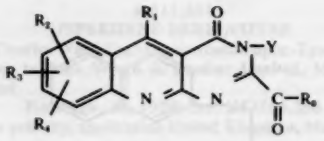
with the proviso that no more than two of R_2, R_3 and R_4 are branched alkyl or alkoxy, and when two of R_2, R_3 and R_4 are branched chain alkyl or alkoxy, said groups are located on non-adjacent carbon atoms;

R_2 and R_3 or R_3 and R_4 when taken together are alkylenedioxy and are selected from the group consisting of methylenedioxy and ethylenedioxy;

with the proviso that only one of said pairs is alkylenedioxy; and

the pharmaceutically acceptable acid addition salts thereof, and the pharmaceutically acceptable cationic salts of those compounds wherein W is carboxyphenyl or Y is carboxyalkyl.

16. A method for the control of peptic ulcers in animals in need of said treatment which comprises administering, by either the intraperitoneal or oral route to the animals an antipeptic ulcer amount of a compound having the formula



wherein

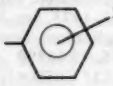
R_6 is selected from the group consisting of alkoxy having from one to four carbon atoms, and NHZ wherein Z is selected from the group consisting of hydrogen, hydroxyalkyl having from two to four carbon atoms, aminoalkyl having from two to four carbon atoms; alkyl having from one to four carbon atoms and:

$$-(alk)_m-(O)_n-W$$

wherein

each of *m* and *n* is 0 or 1, provided that when *n* is 1, *m* is 1; (alk) is alkylene having from one to four carbon atoms, with the proviso that when *n* is 1, (alk) is alkylene having from two to four carbon atoms;

W is selected from the group consisting of pyridyl, imidazolyl and



wherein X is selected from the group consisting of hydrogen, amino, carboxy, hydroxy, alkyl having from one to four carbon atoms and alkoxy having from one to four carbon atoms;

Y is selected from the group consisting of hydrogen, methyl, carboxyalkyl having from one to four carbon atoms in the alkyl group and carboxyalkyl having from one to four carbon atoms in each of the alkyl and alkoxy groups;

R_1 is selected from the group consisting of hydrogen, alkyl having from one to four carbon atoms and phenyl;

each of R_2, R_3 and R_4 when taken separately is selected from the group consisting of hydrogen, alkyl having from one to four carbon atoms, alkoxy having from one to four carbon atoms, halo, hydroxy, benzyloxy, benzoyloxy, alkanoyloxy having from one to four carbon atoms, thiol, methylthio, methylsulfinyl, benzylthio and benzylsulfinyl;

with the proviso that no more than two of R_2, R_3 and R_4 are branched alkyl or alkoxy, and when two of R_2, R_3 and R_4 are branched chain alkyl or alkoxy, said groups are located on non-adjacent carbon atoms;

R_2 and R_3 or R_3 and R_4 when taken together are alkylenedioxy and are selected from the group consisting of methylenedioxy and ethylenedioxy;

with the proviso that only one of said pairs is alkylenedioxy; and

the pharmaceutically acceptable acid addition salts thereof, and the pharmaceutically acceptable cationic salts of those compounds wherein W is carboxyphenyl or Y is carboxyalkyl.

4,011,325
IMIDAZOPYRIMIDINES USEFUL AS AGRICULTURAL AND HORTICULTURAL FUNGICIDES

Ian Trevor Kay, Wokingham, England, assignor to Imperial Chemical Industries Limited, London, England

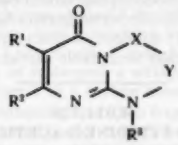
Filed Mar. 27, 1975, Ser. No. 562,423

Claims priority, application United Kingdom, Mar. 27, 1974, 13563/74

Int. Cl.² C07D *487/04*

U.S. Cl. 424—251 8 Claims

1. A compound of formula:



wherein R^1, R^2 and R^3 are alkyl groups of up to six carbon atoms, and X and Y are independently selected from the group consisting of carbonyl, hydroxymethylene, ethoxymethylene and acetoxymethylene.

7. A fungicidal compositions for use against fungal plant pests which comprises a fungicidally effective amount of a compound according to claim 1 in association with an agriculturally and horticulturally acceptable diluent.

4,011,326
2-SUBSTITUTED OXAZOLO[4,5-b]PYRIDINE ANTI-INFLAMMATORY AGENTS

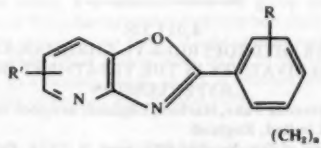
Norman P. Jensen, New Providence, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Filed July 29, 1975, Ser. No. 600,169

Int. Cl.² C07D *498/04*

U.S. Cl. 424—256 5 Claims

1. A compound of structural formula:



wherein

R is

1. hydrogen,
2. halo,
3. lower alkyl, or
4. lower alkoxy;

R′ is

1. hydrogen, or
2. lower alkyl;

n is 3, 4, or 5; and

$-(CH_2)_n$ is linked to adjacent carbon atoms of the benzo group.

4,011,327
COMPOSITIONS CONTAINING 7β-ALKYLTHIODEOXYNUPHARADIN-6α-OLS

Robert Thomas La Londe; Amy Inn-Mei Tsai, both of Syracuse; Chun Juan Wang, Jamesville, and Chunfook Wong, Syracuse, all of N.Y., assignors to Research Corporation, New York, N.Y.

Filed Jan. 31, 1975, Ser. No. 546,191
Int. Cl.² A01N *9/00, 9/22*
U.S. Cl. 424—256 **8 Claims**

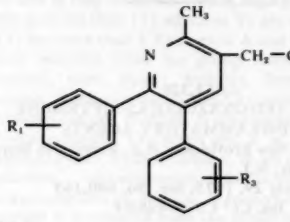
1. A fungicidal composition containing a fungistatically effective amount of a compound selected from the group consisting of:
7β-Methylthiodeoxynupharidin-6α-ol,
7β-Isobutylthiodeoxynupharidin-6α-ol,
7β-(2-Hexenyl)-thiodeoxynupharidin-6α-ol,
7β-(1-Propynyl)-thiodeoxynupharidin-6α-ol, and
7β-(1-Cyclohexyl)-thiodeoxynupharidin-6α-ol,
and a pharmaceutically acceptable carrier.

4,011,328
DERIVATIVES OF PYRIDINE-3-ACETIC ACID, PROCESS FOR THEIR PREPARATION AND APPLICATIONS THEREOF

Henri Pinhas, Paris, and Serge Beranger, Bretigny, both of France, assignors to SERDEX - Societe d'Etudes, de Recherches, de Diffusion et d'Exploitation, Puteaux, France

Filed Oct. 15, 1974, Ser. No. 514,778
Claims priority, application France, Oct. 18, 1973, 73.37178
Int. Cl.² A61K *31/44;* **C07D** *213/16*
U.S. Cl. 424—263 **10 Claims**

1. A compound selected from the group consisting of compounds of the formula:



(Ib)

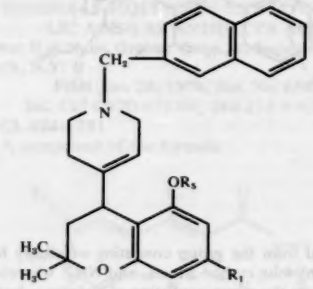
in which R_1 is selected from the group consisting of hydrogen, methoxy, methylthio and halogen and R_3 is selected from the group consisting of hydrogen, methoxy and halogen, and a pharmacologically acceptable salt thereof.

4,011,329
TETRAHYDROPYRID-4-YL-CHROMAN-5-OL DERIVATIVES IN THE TREATMENT OF HYPERTENSION

Charles Sylvester Fake, Harlow, England, assignor to Beecham Group Limited, England

Division of Ser. No. 504,087, Sept. 9, 1974, Pat. No. 3,960,880, which is a continuation-in-part of Ser. No. 324,222, Jan. 16, 1973, Pat. No. 3,853,899. This application Aug. 20, 1975, Ser. No. 606,251
Claims priority, application United Kingdom, Jan. 26, 1972, 3654/72
The portion of the term of this patent subsequent to Aug. 3, 1993, has been disclaimed.
Int. Cl.² A61K *31/40, 31/44, 31/445, 31/535*
U.S. Cl. 424—263 **32 Claims**

15. A method of treating hypertension in humans and animals which comprises administering to a human or animal in need thereof an antihypertensively effective amount of a compound of the formula



(I)

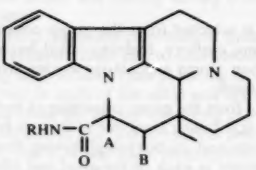
or a pharmaceutically acceptable non-toxic salt thereof, wherein R_1 is alkyl of 5 to 8 carbon atoms which is straight chained or α-substituted by a methyl group or α,α-disubstituted by methyl groups and R_5 is hydrogen, R_6 or CO.R_6 wherein R_6 is alkyl of 1 to 4 carbon atoms or alkyl of 1 to 6 carbon atoms substituted by NR_7R_8 wherein R_7 and R_8 are each hydrogen or alkyl of 1 to 4 carbon atoms or NR_7R_8 is a pyrrolidino, piperidino or morpholino.

4,011,330
VINCAMINIC ACID AMIDES

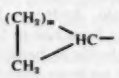
Don Pierre René Lucien Giudicelli, Fontenay-sous-Bois; Henry Najer, Paris; Patrick André Louis Lardenois, Gentilly; Jean Pierre Gaston Lefevre, Paris; Bogdan Iliesco-Branceni, Paris, and Icilio Angelo Girolamo Cavero, Paris, all of France, assignors to Synthelabo, Paris, France

Filed June 23, 1975, Ser. No. 589,088
Claims priority, application France, Sept. 24, 1974, 74.32095; May 26, 1975, 75.16290
Int. Cl.² C07D *471/04*
U.S. Cl. 424—266 **15 Claims**

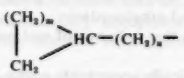
1. A compound of general formula



wherein A and B are both hydrogen atoms and R is a hydrogen atom or a



group, or A and B together represent an additional bond and R is a



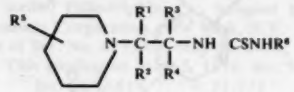
radical, *m* being 1, 2, 3 or 4 and *n* being 0, 1, 2 or 3, or a pharmaceutically acceptable acid addition salt thereof.

4,011,331
PIPERIDINE DERIVATIVES

Adrian Charles Ward Curran, Newcastle-upon-Tyne, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

Filed Feb. 28, 1975, Ser. No. 554,258
Claims priority, application United Kingdom, Mar. 5, 1974, 9766/74
Int. Cl.² C07D 295/14
U.S. Cl. 424—267 5 Claims

1. A compound of formula I



or pharmaceutically acceptable acid addition salts thereof, wherein R^1, R^2, R^3, R^4 and R^5 are the same or different and represent hydrogen, or lower alkyl, and R^6 represents hydrogen, alkyl of 1 to 3 carbon atoms, which may be substituted by diloweralkylamino; lower alkanoyl, benzoyl or halobenzoyl.

4,011,332
HEMORRHAGIC-LESION PRODUCING AND ANTICOAGULANT-CONTAINING COMPOSITIONS AND THEIR USE

Wolfgang Schoetensack, Hegne, and Richard Riedel, Constance, both of Germany, assignors to Byk Gulden Lomberg Chemische Fabrik GmbH, Germany

Filed Feb. 3, 1975, Ser. No. 546,765
Claims priority, application Luxembourg, Feb. 20, 1974, 69428
Int. Cl.² A61K 31/415, 31/37, 31/33
U.S. Cl. 424—273 22 Claims

1. A composition which comprises (a) component means to inhibit mammalian blood clotting and (b) component means to produce hemorrhagic alimentary canal lesions when administered in a single oral dose of less than 50 mg/kg of body weight to a Sprague-Dawley rat with an empty stomach, the composition containing component means (a) and component means (b) in a combined concentration of more than 10^{-3} percent by weight based on the total weight of the composition.

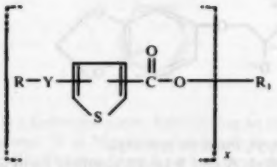
19. A compositon according to claim 1 wherein component means *a* is 4-hydroxy-2-oxo-3-(3-oxo-1-phenyl-butyl)-2H-chromene and component means *b* is 1,5-diphenyl-3-(p-chlorophenyl)-4-pyrazole acetic acid.

4,011,333
SUBSTITUTED THIOPHENECARBOXYLIC ACID AND ESTERS AS HYPOLIPIDEMIC AGENTS

Roger Alan Parker, Cincinnati, Ohio, assignor to Richardson-Merrell Inc., Wilton, Conn.

Filed June 16, 1975, Ser. No. 587,045
Int. Cl.² A61K 31/38
U.S. Cl. 424—275 20 Claims

1. A method of reducing the lipid concentration in the blood of a patient in need thereof which comprises orally or parenterally administering to said patient a blood lipid lowering effective amount of a compound of the formula:



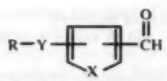
wherein Y is selected from the group consisting of oxygen and divalent sulfur; R is selected from the group consisting of a straight or branched saturated hydrocarbon chain containing from 10 to 20 carbon atoms and a straight or branched unsaturated hydrocarbon chain containing from 10 to 20 carbon atoms and from 1 to 4 double bonds; R_1 is selected from the group consisting of hydrogen, a straight or branched lower alkyl group of from 1 to 6 carbon atoms, benzyl, phenethyl, alkane-poly-yl containing from 3 to 6 carbon atoms and from 2 to 6 univalent bonds, and 1,2,3,4,5,6-cyclohexanehexayl; X is an integer of from 1 to 6 with the proviso that when R_1 is alkane-poly-yl or 1,2,3,4,5,6-cyclohexanehexayl, X is equal to from 2 to 6, and when R_1 is other than alkane-poly-yl or 1,2,3,4,5,6-cyclohexanehexayl, X is equal to 1; or pharmaceutically acceptable salts thereof.

4,011,334
USE OF SUBSTITUTED FURAN AND THIOPHENE CARBOXALDEHYDES AS HYPOLIPIDEMIC AGENTS

Roger Alan Parker, Cincinnati, Ohio, assignor to Richardson-Merrell Inc., Wilton, Conn.

Filed Oct. 3, 1975, Ser. No. 619,305
Int. Cl.² A61K 31/34, 31/38
U.S. Cl. 424—275 7 Claims

1. A method of reducing the lipid concentration in the blood of a patient in need thereof which comprises orally or parenterally administering to said patient a lipid-lowering effective amount of a compound of the formula:



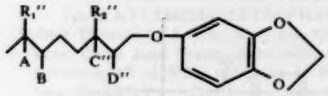
wherein Y is selected from the group consisting of oxygen and divalent sulfur, R is selected from the group consisting of a straight or branched saturated hydrocarbon chain having from 10 to 20 carbon atoms and a straight or branched unsaturated hydrocarbon chain having from 10 to 20 carbon atoms and from 1 to 4 double bonds, and X is selected from the group consisting of oxygen and divalent sulfur.

4,011,335
METHYLENE DIOXYPHENYL ETHERS

Walter Hangartner, Schofflisdorf, and René Zurflueh, Pfaffhausen, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed June 5, 1975, Ser. No. 584,246
Claims priority, application Switzerland, June 17, 1974, 8250/74
Int. Cl.² A61K 31/36
U.S. Cl. 424—282 17 Claims

1. A phenyl derivative having the formula:



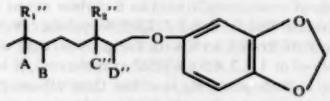
(I)

wherein

R_1'' is propyl, butyl or isobutyl;

R_2'' is methyl, A and B taken together form an oxygen and C'' and D'' are individually hydrogen or taken together form a carbon to carbon bond; with the provision that when R_1'' is isobutyl and R_2'' is methyl, C'' and D'' both are hydrogen.

11. A pesticidal composition for th control of Lepidoptera and Coleoptera which contains as an essential active ingredient or essential active ingredients one or more of the phenyl derivatives of the formula:



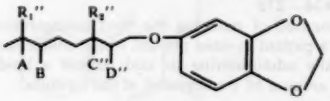
wherein

R_1'' is propyl, butyl or isobutyl;

R_2'' is methyl; A and B taken together form an oxygen bridge

and C'' and D'' are individually hydrogen or taken together form a carbon to carbon bond.

16. A process for protecting materials from Lepidoptera and Coleoptera comprising applying to said material an effective amount of a composition containing as an active ingredient a compound of the formula:



wherein

R_1'' is ;propyl, butyl or isobutyl;

R_2'' is methyl, A and B taken together form an oxygen bridge and

C'' and D'' are individually hydrogen or taken together form a carbon to carbon bond;

or mixtures thereof and an inert carrier.

4,011,336

3-(p-BIPHENYLYL)-BUTYRONITRILE AND THERAPEUTIC COMPOSITIONS CONTAINING THE SAME

August Amann, Ludwigshafen; Heinz Georg Vilhuber, Speyer; Johannes Kunze, Carlsberg; Hubert Giertz, Limburgerhof, and Albrecht Franke, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Nov. 28, 1975, Ser. No. 636,167

Claims priority, application Germany, Dec. 3, 1974, 2456958

Int. Cl.² A61K *31/275*; **C07C** *121/66*

U.S. Cl. 424—304 **4 Claims**

1. 3-(p-Biphenylyl)-butyronitrile.

2. A therapeutic composition comprising in addition to a suitable carrier, excipient or diluent, an effective amount of 3-(p-biphenylyl)-butyronitrile as an active ingredient.

4,011,337

OXAMIDE-OXAMIC COMPOUNDS, COMPOSITIONS AND METHODS OF USE

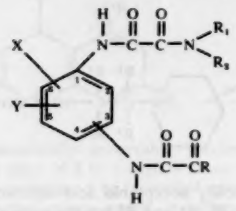
Charles M. Hall; Richard S. P. Hsi, and John B. Wright, all of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed July 7, 1975, Ser. No. 593,632

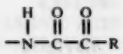
Int. Cl.² A61K *31/24*; **C07C** *103/28*

U.S. Cl. 424—309 **12 Claims**

1. Compounds of the formula:

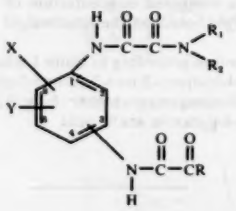


wherein X and Y are the same or different and are selected from the group consisting of hydrogen, fluorine, chlorine, bromine, trifluoromethyl, acetyl, phenyl, alkyl of one to six carbon atoms, inclusive, alkoxy of one to six carbon atoms, inclusive, and nitro;

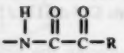


is at the 3 or 4 position; R_1 and R_2 are the same or different and are selected from the group consisting of hydrogen, alkyl of one to six carbon atoms, inclusive, monohydroxyalkyl wherein alkyl is from two to six carbon atoms, inclusive, and the hydroxy is not on the alpha carbon atom, and tris(hydroxymethyl)methyl with the proviso that when R_1 has a tertiary carbon atom adjacent to the nitrogen atom, then R_2 does not have a tertiary carbon atom adjacent to the nitrogen atom; R is OM wherein M is selected from the group consisting of hydrogen, a physiologically acceptable metal or amine cation, and alkyl of one to six carbon atoms, inclusive.

11. A method for the prophylactic treatment of allergy of a reagin or non-reagin mediated nature which comprises administering to a mammal in need of said treatment an anti-allergy effective amount of a compound of the formula



wherein X and Y are the same or different and are selected from the group consisting of hydrogen, fluorine, chlorine, bromine, trifluoromethyl, acetyl, phenyl, alkyl of one to six carbon atoms, inclusive, alkoxy of one to six carbon atoms, inclusive, and nitro;



is at the 3 of 4 position; R_1 and R_2 are the same or different and are selected from the group consisting of hydrogen, alkyl

of one to six carbon atoms, inclusive, monohydroxyalkyl wherein alkyl is from two to six carbon atoms, inclusive, and the hydroxy is not on the alpha carbon atom, and tris(hydroxymethyl)methyl with the proviso that when R_1 has a tertiary carbon atom adjacent to the nitrogen atom, the R_2 does not have a tertiary carbon atom adjacent to the nitrogen atom; R is OM wherein M is selected from the group consisting of hydrogen, a physiologically acceptable metal or amine cation, and alkyl of one to six carbon atoms, inclusive.

4,011,338

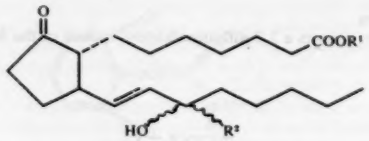
15-METHYL PROSTAGLANDIN COMPOUNDS HAVING BRONCHODILATING ACTIVITY

Donald P. Strike, Philadelphia, Pa., assignor to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 473,604, May 28, 1974, Pat. No. 3,972,917. This application Mar. 5, 1976, Ser. No. 664,117
Int. Cl.² A61K *31/19, 31/215*
U.S. Cl. 424—317 **3 Claims**

1. A process for relieving bronchial spasm and facilitating breathing in warm-blooded animals which comprises administering to a warm-blooded animal in need thereof an amount sufficient to relieve bronchial spasm and facilitate breathing in said warm-blooded animal of a composition comprising:

a. a compound of the formula



wherein R^1 is hydrogen, alkyl of from 1 to about 6 carbon atoms, alkali metal, or a pharmacologically-acceptable cation derived from ammonia or a basic amine, and R^2 is alkyl of from 1 to about 6 carbon atoms; and

b. a pharmacologically-acceptable carrier.

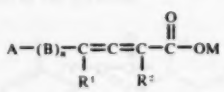
4,011,339

HYPOLIPIDEMIC ALLENE CARBOXYLIC ACIDS

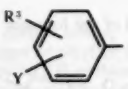
Eugene E. Galantay, Liestal, Switzerland, and Faizulla G. Kathawala, West Orange, N.J., assignors to Sandoz, Inc., E. Hanover, N.J.

Filed Aug. 15, 1975, Ser. No. 605,040
Int. Cl.² A61K *31/19*
U.S. Cl. 424—317 **32 Claims**

1. A compound of the formula



wherein *n* is 0 or 1;



wherein Y is a hydrogen atom, alkyl having from 1 to 4 carbon atoms, alkoxy having from 1 to 24 carbon atoms, alkylthio having from 1 to 24 carbon atoms, halo having an atomic weight of from about 19 to 36, cyclohexyl, phenoxy or substituted or unsubstituted phenyl of the formula

wherein X is a hydrogen atom, halo having an atomic weight of from about 19 to 36, alkoxy having from 1 to 4 carbon atoms or alkyl having from 1 to 4 carbon atoms;

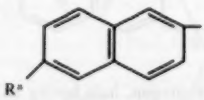
n' is 1 or 2;

each of R1 and R2, independently, is a hydrogen atom or alkyl having from 1 to 4 carbon atoms;

R3 is a hydrogen atom, halo having an atomic weight of from about 19 to 36, or alkyl having from 1 to 4 carbon atoms; amd

when *n* is 0,

then A may also be



wherein R^8 is hydrogen, halo having an atomic weight of from about 19 to 36, alkyl having from 1 to 4 carbon atoms, alkoxy having from 1 to 4 carbon atoms, alkylthio having from 1 to 4 carbon atoms, or difluoromethoxy;

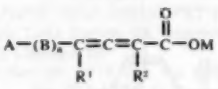
B is

wherein each of R^4 and R^5 is, independently, alkyl having from 1 to 3 carbon atoms,

and M is a hydrogen atom, or a cation forming a non-toxic pharmaceutically acceptable salt,

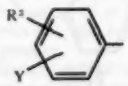
provided that when *n* is 0, then Y and R^3 are not both hydrogen atoms.

30. A method of lowering the level of lipids in the blood of a mammal comprising administrating to said mammal an amount effective in lowering the level of lipids in the blood of said mammal of a compound of the formula:



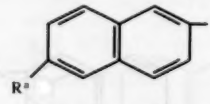
wherein *n* is 0 or 1;

wherein A is



wherein Y is a hydrogen atom, alkyl having from 1 to 4 carbon atoms, alkoxy having from 1 to 24 carbon atoms, alkylthio having from 1 to 24 carbon atoms, halo having an atomic weight of from about 19 to 36, cyclohexyl, phenoxy or substituted or unsubstituted phenyl of the formula

wherein X is a hydrogen atom, halo having an atomic weight of from about 19 to 36, alkoxy having from 1 to 4 carbon atoms or alkyl having from 1 to 4 carbon atoms;
n' is 1 or 2;
each of R^1 and R^2, independently, is a hydrogen atom or alkyl having from 1 to 4 carbon atoms;
R^3 is a hydrogen atom, halo having an atomic weight of from about 19 to 36, or alkyl having from 1 to 4 carbon atoms, and
when n is 0 then A may also be



wherein R^a is hydrogen, halo having an atomic weight of from about 19 to 36, alkyl having from 1 to 4 carbon atoms, alkoxy having from 1 to 4 carbon atoms, alkylthio having from 1 to 4 carbon atoms, or difluoromethoxy;
B is

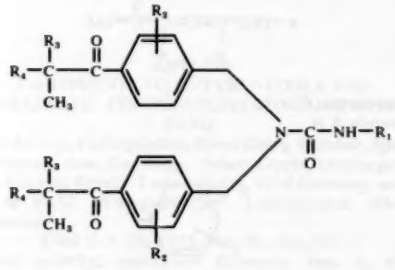
wherein each of R^4 and R^5 is, independently, alkyl having from 1 to 3 carbon atoms, and
M is a hydrogen atom, or a cation forming a non-toxic pharmaceutically acceptable salt.

4,011,340
HYPOLIPIDEMIC BIS(PIVALOYLBENZYL) UREAS

Jeffrey Nadelson, Lake Parsippany, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 575,726, May 8, 1975, abandoned. This application Oct. 28, 1975, Ser. No. 625,816
Int. Cl.² A61K *31/17*; C07C *127/17*
U.S. Cl. 424—322 **6 Claims**

1. A compound of the formula



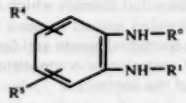
where
R_1 represents lower alkyl having 1 to 4 carbon atoms, and
R_2 each independently represents hydrogen, halo having an atomic weight of about 19 to 36, and
R_3 and R_4 each independently represent lower alkyl having 1 to 2 carbon atoms.

4,011,341
RING-SUBSTITUTED N-(2,2-DIFLUOROALKANOYL)-O-PHENYLENEDIAMINE INSECTICIDES

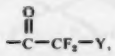
George O. P. O'Doherty, Greenfield, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 479,073, June 13, 1974, Pat. No. 3,907,892, which is a continuation-in-part of Ser. No. 277,452, Aug. 2, 1972, abandoned, which is a continuation-in-part of Ser. No. 47,857, June 19, 1970, abandoned, and a continuation-in-part of Ser. No. 17,865, March 9, 1970, abandoned, which is a continuation-in-part of Ser. No. 803,998, March 3, 1969, abandoned. This application June 25, 1975, Ser. No. 590,226
Int. Cl.² A01N *9/20*, *9/24*
U.S. Cl. 424—324 **3 Claims**

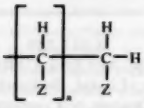
1. The method for the control of insect and arachnid pests which comprises contacting an insect or arachnid with an inactivating amount of an active agent, said active agent being a compound of the formula



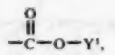
wherein
R° represents a 2,2-difluoroalkanoyl radical of the formula



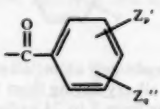
wherein Y represents hydrogen, chlorine, fluorine, difluoromethyl, perfluoroalkyl of C_1–C_6, or radical of the formula



wherein each Z independently represents hydrogen or halogen and n represents 0 or 1;
R^1 represents
hydrogen,
radical of the formula



wherein Y^1 represents loweralkyl of C_1–C_4 or phenyl,
benzoyl,
furoyl,
naphthoyl, or
substituted benzoyl of the formula



wherein each Z' independently represents halo or nitro, Z'' represents loweralkyl of C_1–C_4 or loweralkoxy of C_1–C_4, p

represents 0, 1, or 2, q represents 0 or 1, and the sum of p and q is 1–3;

R^4 represents nitro; and

R^5 represents trifluoromethyl, difluoromethyl, or difluorochloromethyl, subject to the limitations (1) that R^4 and R^5 are meta to one another, and (2) that where R^1 represents hydrogen, the ring position ortho to the —NH-R^1 bears one of the designated R^4 or R^5 moieties.

4,011,342

METHOD AND COMPOSITION FOR THE TREATMENT OF HYPERTENSION WITH ORTHO-DISUBSTITUTED ARYLGUANIDINES

Jean Schwartz, and Camille Georges Wermuth, both of Strasbourg, France, assignors to Seperic, Morat, Switzerland

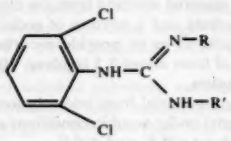
Division of Ser. No. 461,128, April 15, 1974, abandoned, which is a continuation of Ser. No. 258,050, May 30, 1972, abandoned. This application Feb. 26, 1975, Ser. No. 553,155

Claims priority, application United Kingdom, June 2, 1971, 18510/71

Int. Cl.² A61K *31/155*

U.S. Cl. 424—326 **2 Claims**

1. An orally administrable therapeutical composition having a hypotensive activity containing from 5 to 20 mg of a compound selected from the group consisting of a guanidine of the formula:



(I)

in which R and R′ are each selected from the group consisting of hydrogen and methyl, and a pharmaceutically acceptable acid addition salt thereof, in a pharmaceutically acceptable carrier.

4,011,343

TRIAZAPENTADIENES AS ACARICIDES AND INSECTICIDES

Michael Raymond Graves Leeming, Canterbury, and Alexander Ballingall Penrose, Eastry near Sandwich, both of England, assignors to Pfizer Inc., New York, N.Y.

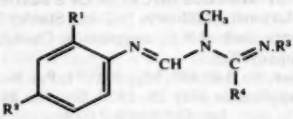
Filed Aug. 5, 1975, Ser. No. 601,988

Claims priority, application United Kingdom, Aug. 23, 1974, 37232/74

Int. Cl.² C07C *123/00*

U.S. Cl. 424—326 **16 Claims**

1. A compound of the formula:



wherein

R^1 is alkyl of 1 to 4 carbon atoms;

R^2 is hydrogen, halogen or alkyl of 1 to 4 carbon atoms;

R^3 is cycloalkyl of 4 to 10 carbon atoms, or cycloalkyl substituted by halogen or alkyl of 1 to 4 carbon atoms; alkyl of 1 to 4 carbon atoms substituted by phenyl or phenyl substituted by one or two C_1–C_4 alkyl or C_1–C_4 alkoxy groups; or alkyl of 1 to 4 carbon atoms substituted by cycloalkyl of 4 to 10 carbon atoms or cycloalkyl substituted by halogen or alkyl of 1 to 4 carbon atoms; and

R^4 is hydrogen or alkyl of 1 to 4 carbon atoms; and the pesticidally acceptable acid addition salts thereof.

4,011,344

IMINODIMETHYLENE DI-TERT-ALKYLOPHENONES AND PHENOLS

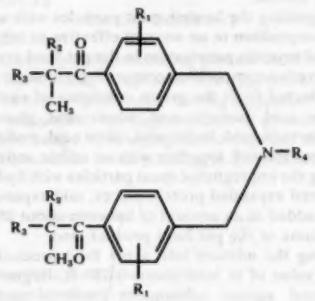
Jeffrey Nadelson, Lake Parsippany, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 558,180, March 14, 1975, abandoned, which is a continuation-in-part of Ser. No. 460,891, April 15, 1974, abandoned. This application June 20, 1975, Ser. No. 588,789

Int. Cl.² A01N *9/20*; C07C *87/28*

U.S. Cl. 424—330 **13 Claims**

1. A compound of the formula:



wherein

R_1 represents hydrogen, halo having an atomic weight of about 19 to 36 or straight chain lower alkoxy, and

R_2 and R_3 each independently represent lower alkyl having 1 to 2 carbon atoms, and

R_4 represents lower alkyl having 1 to 4 carbon atoms,

or a pharmaceutically acceptable salt thereof.

13. A method of treating lipidemia which comprises administering to a mammal in need of said treatment a hypolipidemic effective amount of a compound of claim 1.

4,011,345

EXPANDED SEMI-MOIST PET FOOD

Arthur G. Bartsch, Lake Zurich, Ill., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Nov. 26, 1975, Ser. No. 635,293

Int. Cl.² A23K *1/16*

U.S. Cl. 426—72 **15 Claims**

1. An expanded, semi-moist, sugarless pet food having a moisture content of 20 percent to 40 percent comprising:

a. 0 percent to 30 percent animal protein source;

b. 5 to 30 percent oilseed vegetable protein source;

c. 15 percent to 50 percent of at least one cereal grain derivative — wherein (b), and (c) combine to comprise 40 percent to 65 percent;

d. 3 percent to 9 percent of at least one polyhydric alcohol;

e. 0 percent to 20 percent of at least one fat;

f. up to about 3 percent of at least one edible food grade acid or acid salt sufficient to adjust the pH to 4.0 to 6.0;

g. up to 5 percent of at least one additive selected from the group consisting of salt, vitamins, minerals, coloring and flavoring; and

h. 0.01 percent to 0.5 percent of at least one antimycotic;

i. all percentages being based on the weight of the pet food.

4,011,346

PROCESS FOR THE PRODUCTION OF A FORMED HIGH MOISTURE PET FOOD PRODUCT

Thomas J. Ernst, St. Louis, Mo., assignor to Ralston Purina Company, St. Louis, Mo.

Filed Sept. 18, 1974, Ser. No. 504,795
Int. Cl.² A23B 4/12; A24B 4/14
U.S. Cl. 426—104 15 Claims

1. A process for the production of a formed pet food product having a moisture content exceeding about 40% with a shear value of at least about .080 ft. lb./gram and stabilized against bacterial and mycotic penetration comprising:

a. grinding raw animal meat into particles of a substantially uniform size;

b. heating the ground raw meat to a temperature sufficient to pasteurize the meat and reduce the bacterial contamination thereof;

c. impregnating the heated meat particles with a preservative composition in an amount effective to inhibit bacterial and mycotic penetration in the pet food product, said preservative composition comprising a mixture of a material selected from the group consisting of succinic acid, pyruvic acid, fumaric acid, adipic acid, glucono-Δ-lactone, tartaric acid, lactic acid, citric acid, malic acid, and mixtures thereof, together with an edible antimycotic;

d. mixing the impregnated meat particles with hydrated acid stabilized expanded protein pieces, said expanded pieces being added in an amount of between about 25% to 90% by volume of the pet food product; and

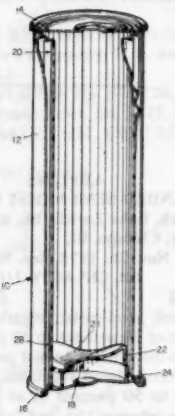
e. forming the mixture into a pet food product having a shear value of at least about 0.080 ft. lb/gram which is stabilized against subsequent bacterial and mycotic growth.

4,011,347

FOOD PRODUCT CONTAINING CUSHIONING MEANS

Edwin D. Griffith, Pemberville, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed May 12, 1975, Ser. No. 576,525
Int. Cl.² B65D 85/30
U.S. Cl. 426—124 3 Claims



1. A package containing a stack of uniformly-shaped individual units of food product and a food product cushioning means, said package comprising, in combination:

a substantially rigid tubular container surrounding said stack of uniformly-shaped individual units of food product, said container having a sidewall formed from a substantially oxygen-impervious material having ends secured thereto; and

a resilient cushioning means positioned within said container supporting the bottom of said stack of uniformly-shaped individual units of food product, said resilient cushioning means being adapted to prevent breakage of said individual food units and including a circular top wall having a contour approximating the contour of the uniformly-shaped units of food product in said stack, a first annular sidewall depending downwardly from the outer extremities of said circular top wall, a flexible connecting ledge extending outwardly from the bottom edge of said first annular sidewall, and a second annular sidewall of greater diameter than said first annular sidewall depending downwardly from the outer extremity of said flexible connecting ledge.

4,011,348

PROCESS FOR INHIBITING BROWNING OF FRUIT

Ray W. Farrier, and Roland B. Leavens, both of Hood River, Oreg., assignors to Diamond Fruit Growers, Inc., Hood River, Oreg.

Continuation-in-part of Ser. No. 256,895, May 25, 1972, abandoned. This application Nov. 6, 1974, Ser. No. 521,206
Int. Cl.² A23B 7/10
U.S. Cl. 426—268 9 Claims

1. A process for preservation of plant material subject to browning which comprises;

applying to the surface of said plant material an aqueous solution having a pH of between 4 and 7.5 and consisting essentially of a material selected from the class consisting of sodium ascorbate and a mixture of sodium ascorbate and ascorbic acid so as to provide ascorbate ion in a concentration of from about 3.5 to about 10 weight percent of the solution,

removing said plant material from said solution and storing said plant material under aerobic conditions at a temperature between about 32° F. and 40° F.

4,011,349

DIETETIC CHOCOLATE COMPOSITION

Alfred Riesen, 6405 Immensee, Switzerland

Filed Sept. 24, 1975, Ser. No. 616,138
Int. Cl.² A23G 1/00
U.S. Cl. 426—548 4 Claims

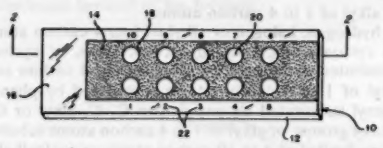
1. A dietetic chocolate composition comprising as major constituents about 9% cocoa beans, about 15% powdered whole milk, about 7% powdered skim milk, about 31% sorbitol and 38% added cocoa butter, and as minor constituents about an effective amount of a synthetic sweetener selected from the group consisting of cyclamate and saccharin about 0.6% lecithin and about 0.01% vanilla, the weight of said minor constituents being based on the total weight of the major constituents.

4,011,350

METHOD OF MAKING MICROSCOPE SLIDE SYSTEM

Arthur L. Markovits, Millburn, N.J. and Stanley W. Wolfson, West Orange, both of N.J., assignors to Chemical Sciences, Inc., Whippany, N.J.

Division of Ser. No. 140,497, May 5, 1971, Pat. No. 3,736,042. This application May 29, 1973, Ser. No. 364,240
Int. Cl.² G02B 21/34
U.S. Cl. 427—2 9 Claims



1. A method of preparing a microscope slide system including the steps of:

a. spraying a layer of fluorocarbon on one surface of a microscope slide, said layer having an approximate thickness range between 7.5×10^{-5} and 1.5×10^{-4} inch, said fluorocarbon layer having a plurality of openings passing therethrough for forming reactant regions on said surface of said microscope slide; and,

b. applying a layer of 0.02% agarose solution to said surface of said microscope slide only within and completely covering said reactant region.

4,011,351
PREPARATION OF RESIST IMAGE WITH METHACRYLATE POLYMERS

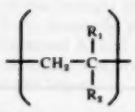
Edward Gipstein, Saratoga, Calif.; Wayne M. Moreau, Wappingers Falls, N.Y., and Omar U. Need, III, San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 29, 1975, Ser. No. 545,063
Int. Cl.² B05D *3/06;* **G03C** *5/00*
U.S. Cl. 427—43 **15 Claims**

1. A method for the production of a positive resist image comprising the steps of:

A. exposing a film consisting essentially of a non-crosslinked polymeric material to electron beam radiation from 10^{-5} to about 10^{-6} coulombs/cm² in a predetermined pattern, wherein the non-crosslinked polymeric material has a number average molecular weight (Mn) in the range of about 5×10^3 to about $1{,}500 \times 10^3$ and a weight average molecular weight (Mw) in the range of about 10×10^3 to about 300×10^3; and is selected from the group consisting of:

1. non-crosslinked polymeric material containing:
   a. polymerized alkyl methacrylate units wherein the alkyl group contains from 1 to 4 carbon atoms; and
   b. polymerized units of at least one other ethylenically unsaturated monomer selected from the group consisting of an acrylic acid derivative containing at least one α-halogen or α-cyano substituent, an acrylate derivative containing at least one α-halogen or α-cyano substituent; acrylonitrile derivative containing at least one α-halogen substituent; vinyl chloride; vinylidene chloride and mixtures thereof and having the formula:



wherein R_1 is selected from the group consisting of H, CH_3, CN, Cl, CH_2Cl, CH_2CN, Br, CH_2Br, I, CH_2I, F and wherein R_2 is selected from the group of $COOCH_3$, COOH, CN, CH_2CN, Cl, CH_2Cl, Br, CH_2Br, I, CH_2I, F, provided that when R_2 is $COOCH_3$ or COOH then R_1 is other than CH_3 and H; wherein the amount of the polymerized alkyl methacrylate units (a) is from about 50 to about 99 mole % and the amount of the polymerized units of the at least one other ethylenically unsaturated monomer (b) is from about 50 to about 1 mole % based upon the total moles of (a) and (b) in the polymeric material;

2. posthalogenated polymer of the above polymeric material (1) wherein the halogen content due to the posthalogenation is from about 1 to about 10 mole %, and wherein the total halogen content and cyano content is from about 2 to about 50 mole %;

3. posthalogenated polyalkyl methacrylate wherein the alkyl group contains from 1 to 4 carbon atoms and wherein the halogen content is between about 1 and about 10 mole %; and

4. mixtures of any of (1), (2), or (3) with each other;

B. continuing said exposure until substantial degradation of said polymeric material to lower molecular weight products is achieved in the exposed areas; and

C. removing the degraded products in the exposed areas.

4,011,352
THERMOGRAPHIC PROCESS OF PRODUCING AN IMAGE

Wilhelmus Janssens, Aarschot; Raymond Gerard Lemahieu, Mortsel; Jozef Aimé Dierckx, Hove, and Daniël Aloïs Claeys, Mortsel, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Continuation of Ser. No. 428,805, Dec. 27, 1973, abandoned. This application Nov. 28, 1975, Ser. No. 635,904
Claims priority, application United Kingdom, Sept. 14, 1973, 43337/73
Int. Cl.² B41M *5/12*
U.S. Cl. 427—145 **12 Claims**

1. In a thermographic recording process in which a dye is produced by bringing image-wise into reactive contact with the aid of heat an organic acid-reacting compound with a dye precursor compound, the improvement of producing a light stable yellow image by bringing said compound into contact with a dye precursor corresponding to the following general formula:

$$X - Ar - CH = N - R_1$$

wherein:

Ar represents a phenylene nucleus,

R_1 represents a phenyl group and

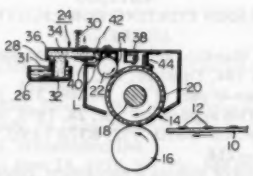
X represents a

group wherein each of R_2 and R_3 (same or different) represents an alkyl group, a cyanoalkyl group, a chloroalkyl group, and an alkoxy carbonylalkyl group.

4,011,353
APPARATUS FOR FORMING A UNIFORM LIQUID FILM ON A ROLLER

Toyoo Okamoto; Takashi Suzuki, and Keiichi Maruta, all of Tokyo, Japan, assignors to Kabushiki Kaisha Ricoh, Tokyo, Japan

Filed May 1, 1974, Ser. No. 465,792
Claims priority, application Japan, May 9, 1973, 48-50634
Int. Cl.² B05C *11/00;* **G03G** *13/20*
U.S. Cl. 427—194 **10 Claims**



10. A method of applying a liquid of substantially constant thickness onto the circumference of a driven roller utilizing a transfer roller disposed parallel to the driven roller, and wherein the transfer roller receives liquid from an applicator which comprises a reservoir containing the liquid, a porous member partially immersed in the liquid, a porous cloth contacting the porous member and the circumference of the

transfer roller, and biasing means to urge the porous cloth against the circumference of the transfer roller, the method comprising the steps of transferring liquid from said transfer roller to said driven roller when the thickness of the liquid on said driven roller is below a predetermined value by causing said driven roller to drive and rotate said transfer roller so that the latter picks up liquid from said porous cloth and transfers the same liquid to said transfer roller, and interrupting transfer of liquid from said transfer roller to said driven roller when the thickness of the liquid on said driven roller is above a predetermined value by halting the rotation of said transfer roller as said driven roller continues to rotate, whereby a uniform film of liquid of substantially constant thickness is applied onto the circumference of said driven roller.

4,011,354

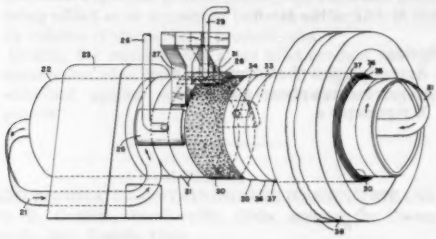
METHOD AND APPARATUS FOR MAKING TUBULAR RESIN ELEMENTS SUCH AS PIPES

Frede Hilmar Drostholm, Vedbaek, Denmark, and Leonard S. Meyer, Columbia, S.C., assignors to Frede Hilmar Drostholm, Vedbaek, Denmark

Filed Mar. 22, 1972, Ser. No. 236,892

Int. Cl.² B29C *13/04*; B65H *81/04*

U.S. Cl. 427—195 **11 Claims**



1. In the manufacture of tubular fiber reinforced resin elements, the method which comprises applying a tube lining to an axially moving mandrel surface to be advanced axially of the mandrel by said moving surface, applying at least one layer of liquid fiber reinforced thermosetting resin material superimposed upon the tube lining to be advanced axially with the lining, the lining layer being applied by depositing solid particulate thermoplastic resin material on the mandrel surface, heating the particulate resin material to soften and fuse it in situ on the mandrel surface, and heating the thermosetting resin material to effect solidification thereof during axial advancement of the superimposed layers with the moving mandrel surface.

4,011,355

EMULSION COATING FOR LIGHTWEIGHT AGGREGATE

Theodore O. Mandish, and Doneath M. Mandish, both of Rte. No. 2, Box 184, Titusville, Fla. 32780

Continuation-in-part of Ser. No. 488,318, July 15, 1974, abandoned. This application Apr. 28, 1975, Ser. No. 572,153

Int. Cl.² B05D *7/02*; B32B *13/02*, *5/18*

U.S. Cl. 427—214 **2 Claims**

1. A method of making a lightweight, coated aggregate for use in forming a lightweight concrete material, comprising the steps of:

a. forming a mixture of approximately equal parts by volume of dehydrated lime and hydrated alumina in combination with water having a wetting agent therein to form a suitable consistency when thoroughly mixed in a mixer;

b. coating lightweight expanded polymer beads with said mixture; and

c. mixing cement with said coated expanded beads;

said aqueous mixture of dehydrated lime and hydrated alumina, polymer beads and cement being employed in a ratio such that approximately 1 to 2 quarts of said aqueous mixture of dehydrated lime and hydrated alumina are employed for each approximately 6 cubic feet of polymer beads and approximately 2 quarts of cement.

4,011,356

LAMINATED GLAZING PANE

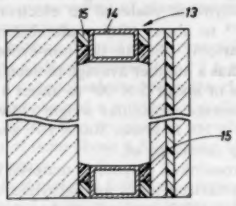
Emmanuel Lambert, Jumet, and Lucien Leger, Montigny-le-Tilleul, both of Belgium, assignors to Glaverbel-Mecaniver S.A., Watermael-Boitsfort, Belgium

Filed Dec. 19, 1974, Ser. No. 534,218

Claims priority, application United Kingdom, Jan. 29, 1974, 4109/74; Jan. 29, 1974, 4111/74

Int. Cl.² E06B *3/24*; E04B *1/82*; B32B *17/10*

U.S. Cl. 428—34 **19 Claims**



1. In a laminated glazing pane comprising at least two sheets of vitreous material and an intervening layer of adhesive material bonding said sheets together, the improvement wherein said intervening layer is of a predetermined thickness and comprises polyvinyl chloride and an added plasticizer, said plasticizer being present in a proportion of 30.5% to 35%, by weight, of said intervening layer, for causing the numerical value of the base frequency (f) of said laminated pane to lie in the range $0.70f_0 \leq f \leq 0.97f_0$ where f_0 is the theoretical base frequency of the pane, whereby the pane has improved sound damping properties.

4,011,357

LAMINATE OF BIAXIALLY ORIENTED POLYSTYRENE FILM AND POLYSTYRENE FOAM

Donald A. Haase, Penfield, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 448,851, March 7, 1974, abandoned, which is a continuation of Ser. No. 211,088, Dec. 22, 1971, abandoned, which is a division of Ser. No. 876,814, Nov. 14, 1969, Pat. No. 3,682,730. This application Sept. 23, 1975, Ser. No. 615,947

Int. Cl.² B32B *3/26*

U.S. Cl. 428—215 **8 Claims**

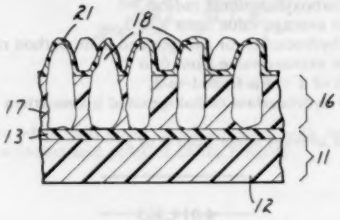
1. A laminate of a flat extruded sheet of pentane blown polystyrene foam directly heat sealed to a preformed film of biaxially oriented film of polystyrene in which laminate the preformed film of polystyrene has not undergone disorientation as a result of being directly heat sealed to the foam sheet.

8. A laminate, as defined in claim **1**, consisting of a layer of the foam sheet heat sealed to the film of polystyrene and having an overall thickness of about 48 mils.

4,011,358
ARTICLE HAVING A COEXTRUDED POLYESTER SUPPORT FILM

Glenn E. Roelofs, Oakdale, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed July 23, 1974, Ser. No. 491,131
Int. Cl.² B32B 27/36, 27/06
U.S. Cl. 428—287 12 Claims



1. Composite coated sheet material comprising, in combination:

1. a biaxially oriented and heat-set coextruded support film consisting essentially of (A) a base layer of dimensionally stable crystalline first polyester selected from the group consisting of polyethylene terephthalate, polycyclohexane dimethyl terephthalate and polyethylene naphthalate (B) an adhesion-promoting layer having a thickness from about one-fourth of the total thickness of said support layer to about 1 mil thick of a second polyester having a minor degree of crystallinity between about 20° C and 230° C and melting at a temperature less than about 230° C wherein said adhesion-promoting layer is a polyester produced by the condensation reaction of a dicarboxylic acid component consisting of from about 10 to about 100 mole percent of a dicarboxylic acid selected from the group consisting of isophthalic acid, hexahydroterephthalic acid, sebaic acid, succinic acid, adipic acid, azelaic acid, suberic acid, pimelic acid, glutaric acid or mixtures thereof, or the diesters of such acids and correspondingly from 90 to zero mole percent of terephthalic acid, and a glycol component, in substantially equimolar proportions with the dicarboxylic acid component, wherein the glycol component is selected from the group consisting of polymethylene glycol of the formula $HO(CH_2)_nOH$, wherein n is an integer of 2–10, neopentyl glycol, 1,4-cyclohexane dimethanol and bisphenol A; and
2. a coating of polymeric material firmly adherently bonded to the face of said (B) layer.

4,011,359
INTERLEAVING MATERIALS COMPRISING PARTICULATE SEPARATOR AND ACIDIC MATERIALS, FOR SEPARATING GLASS SHEETS

Gordon Thomas Simpkin, Ormskirk, and Kenneth Ashcroft, Liverpool, both of England, assignors to Pilkington Brothers Limited, St. Helens, England

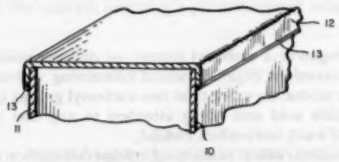
Filed Apr. 22, 1975, Ser. No. 570,314
Claims priority, application United Kingdom, Apr. 25, 1974, 18169/74
Int. Cl.² B32B 17/08; C08L 1/02
U.S. Cl. 428—326 25 Claims

1. An interleaving material for separating glass sheets and protecting them from staining, comprising a porous finely divided support material, impregnated with a weak organic acid selected from the group consisting of dibasic aliphatic acids, aromatic acids and mixtures thereof, and fine particles of a chemically inert plastics material selected from the group consisting of a thermoplastic homopolymer of an ethylenically unsaturated monomer, a thermoplastic copolymer of ethylenically unsaturated monomers and mixtures thereof, the particle size of said plastics material being larger than that of said acid-impregnated porous support material and the particle sizes of both said plastics material and said support material being such that the particles will pass through a 10 mesh British Standard sieve but will be retained on a 300 mesh British Standard sieve, said plastics material and said acid-impregnated porous support material being present in relative proportions between 90:10 and 10:90 parts by weight.

4,011,360
ELECTRICALLY CONDUCTIVE SILICONE RUBBER STOCK

Thomas William Walsh, North Andover, Mass., assignor to Chomerics, Inc., Woburn, Mass.

Continuation of Ser. No. 459,486, April 10, 1974, abandoned.
This application Jan. 23, 1976, Ser. No. 651,806
Int. Cl.² B32B 5/16
U.S. Cl. 428—402 11 Claims



1. An uncured one component room temperature moisture curing electrically conductive RTV silicone rubber stock stored under anhydrous conditions and which will remain essentially uncured when so stored at room temperature and which comprises the mixture of essentially:

1. 75 to 98 parts by weight (PBW) of electrically conductive particles each comprising glass cores having an outer surface of silver;
2. 2 to 25 PBW of a linear siloxane polymer of the average molecular formula $R'R_2SiO[R_2SiO]_xSiR_2R'$ wherein each R is a monovalent hydrocarbon radical or a halogenated monovalent hydrocarbon radical, each R′ is a hydrogen atom, alkoxy radical, aryloxy radical, hydroxy radical or acyloxy group and x has an average value of from 50 to 10,000; and
3. 0.0005 to 0.020 parts by weight, based on each part by weight of the siloxane polymer, of a curing agent which is an aminosilane of the formula $R''_aSi(NY_2)_{4-a}$ or an aminosilazane of the formula

$$(Y_2N)_aR''_bSiNH[R''_b(Y_2N)_cSiNH]_mSiR''_b(NY_2)_a$$

wherein each R″ is an alkyl radical, aryl radical, or aralkyl radical, each Y is a hydrogen atom, alkyl radical, aryl radical or aralkyl radical, n is 0 or 1, m is at least 1, a is 2 or 3, b is 0 or 1, and c is 1 or 2.

4,011,361
FLUOROPOLYMER COATING COMPOSITIONS HAVING IMPROVED ADHESION

Eustathios Vassiliou, Newark, Del., and Thomas P. Concannon, Newtown Square, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 18, 1975, Ser. No. 588,005
Int. Cl.² B32B 27/00; C08G 51/24; C08J 1/48
U.S. Cl. 428—422 21 Claims

1. A coating composition comprising

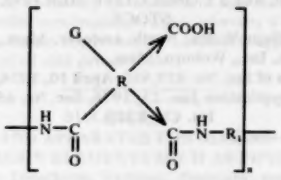
a. about 10%–90%, by weight of the total of (a) and (b) solids, of a particulate polymer of monoethylenically unsaturated hydrocarbon monomers completely substituted with fluorine atoms or a combination of fluorine atoms and chlorine atoms, the polymer having a number average molecular weight of at least 20,000;

b. about 10%–90%, by weight of the total of (a) and (b) solids, of a binder which comprises

1. about 5–95%, by weight of the total of (1) and (2) solids, of a colloidal silica which air-dries to form a continuous film when laid down by itself,

and

2. about 5–95%, by weight of the total of (1) and (2) solids, of a salt of a polyamide acid represented by the structure



where

G is hydrogen or a carboxyl group; → denotes isomerism;

R is a tetravalent organic radical containing at least two carbon atoms, no more than two carbonyl groups of each polyamide acid unit being attached to any one carbon atom of each tetravalent radical;

R_1 is a divalent radical containing at least two carbon atoms, the amide groups of adjacent polyamide acid units each being attached to separate atoms of said divalent radical;

and

n is a number large enough to give the polyamide acid an inherent viscosity of at least 0.1, measured as a 0.5% solution in N,N-dimethylacetamide at 30° C.;

neutralized with a stoichiometric amount of a tertiary amine;

c. about 10–90%, by weight of the polyamide acid amide salt, of N-methyl pyrrolidone, dimethyl formamide, dimethylacetamide, dimethysulfoxide, cresylic acid, sulfolane or formamide;

and

d. a liquid carrier.

11. An article bearing a primer coat of the composition of claim **1**, topcoated with a fused fluoropolymer enamel.

4,011,362

METAL SUBSTRATES WITH CARBOXYFUNCTIONAL SILOXANE RELEASE COATINGS

Howard Franklin Stewart, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 457,007, April 1, 1974, abandoned. This application Jan. 12, 1976, Ser. No. 648,066

Int. Cl.² B32B *15/08*; **C07F** *7/08*; **C08G** *77/14*, *77/22*

U.S. Cl. 428—447 **3 Claims**

1. A metal substrate having on the surface thereof, in an amount sufficient to improve the release characteristics of said substrate, a composition consisting essentially of (1) from 1 to 99 percent by weight of a siloxane fluid having the general formula $(CH_3)_3SiO[(CH_3)_2SiO]_xSi(CH_3)_3$ wherein *x* is an integer, and (2) from 1 to 99 percent by weight of a siloxane composed essentially of from 0.1 to 50 mole percent of $R_aR'_bSiO_{(4-a-b)/2}$ units and from 50 to 99.9 mole percent of $R''_cSiO_{(4-c)/2}$ units wherein

R is a carboxyfunctional radical,

a has an average value from 1 to 3,

R′ is a hydrocarbon or halogenated hydrocarbon radical,

b has an average value from 0 to 2,

the sum of $a + b$ is from 1 to 3,

R″ is a hydrocarbon or halogenated hydrocarbon radical, and *c* has an average value from 0 to 3.

3. In a process of treating a metal substrate to improve the release characteristics thereof, said process including the step of applying a substance to the metal substrate which substance enhances the release characteristics of said substrate, the improvement comprising applying to the metal substrate as the substance which enhances the release characteristics a composition consisting essentially of (1) from 1 to 99 percent by weight of a siloxane fluid having the general formula $(CH_3)_3SiO[(CH_3)_2SiO]_xSi(CH_{33})$ wherein *x* is an integer, and (2) from 1 to 99 percent by weight of a siloxane composed essentially of from 0.1 to 50 mole percent of $R_aR'_bSiO_{(4-a-b)/2}$ units and from 50 to 99.9 mole percent of $R''_cSiO_{(4-c)/2}$ units wherein

R is a carboxyfunctional radical,

a has an average value from 1 to 3,

R′ is a hydrocarbon or halogenated hydrocarbon radical,

b has an average value from 0 to 2,

the sum of $a + b$ is from 1 to 3,

R″ is a hydrocarbon or halogenated hydrocarbon radical, and

c has an average value from 0 to 3.

4,011,363

CURABLE AMINO RESINS

Richard D. Sundie, Montvale, and Walter L. Pennie, Morristown, both of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Division of Ser. No. 530,313, Dec. 6, 1974, Pat. No. 3,979,492, which is a division of Ser. No. 431,535, Jan. 7, 1974, Pat. No. 3,891,590, which is a continuation of Ser. No. 210,160, Dec. 20, 1971, abandoned. This application May 18, 1976, Ser. No. 687,572

Int. Cl.² B32B *27/42*

U.S. Cl. 428—524 **16 Claims**

1. A fiberboard comprising fibrous material impregnated with a curable amino resin, said resin being prepared by a process comprising the steps of:

a. mixing the following ingredients to form component I:

1. from about 15 to about 25 weight percent urea;
2. from about 30 to about 70 weight percent formaldehyde;
3. from about 4.5 to about 10 weight percent melamine;
4. from about 10 to about 30 weight percent water;
5. from about 0.05 to about 4.0 weight percent stabilizer, said stabilizer comprising a buffering agent which maintains the pH of the composition within the range from about 4.0 to about 7.5;

b. mixing the following ingredients to form component II:

1. from about 35 to about 50 weight percent urea;
2. from about 45 to about 65 weight percent water; and
3. from about 0.5 to about 3.0 weight percent catalyst which promotes the reaction of urea, melamine and formaldehyde; and

c. mixing together from about 40 to about 60 parts of component I with correspondingly from about 60 to about 40 parts of component II to form the curable amino resin.

4,011,364

NON-REVERSIBLE BATTERY COVER

Raymond L. Schenk, Jr., Doylestown, Pa., assignor to Gould Inc., Rolling Meadows, Ill.

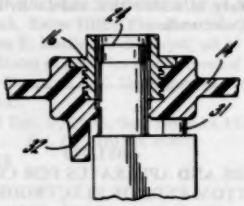
Filed Oct. 1, 1975, Ser. No. 618,500

Int. Cl.² H01M *2/04*

U.S. Cl. 429—1 **5 Claims**

1. A non-reversible cover arrangement for a battery having a casing and at least two symmetrically disposed terminal posts of opposite polarity comprising, in combination, a cover adapted to fit and close said casing and having polarity designating indicia on one side of the center line thereof, said cover having apertures therethrough disposed symmetrically for receiving said terminal posts when said cover is properly oriented so that said indicia is located adjacent said posts of like polarity, and means including eccentric abutments adjacent at least said posts of one polarity and opposing eccentric projections on the underside of said cover adjacent at least the

apertures on one side of said center line for preventing said posts of said one polarity from extending fully through said



apertures when said cover is mis-oriented with said indicia located adjacent said posts of unlike polarity.

4,011,365

ELECTRIC ACCUMULATOR

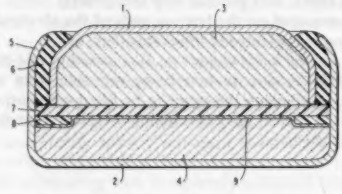
Olle Birger Lindstrom, Taby, Sweden, assignor to AB Olle Lindstrom, Taby, Sweden

Filed Sept. 26, 1975, Ser. No. 617,153

Claims priority, application Sweden, Oct. 3, 1974, 7412505

Int. Cl.² H01M *10/34*

U.S. Cl. 429—60 **10 Claims**



1. Rechargeable electrochemical cell or electric accumulator comprising such cells containing a positive electrode in which the active material in its fully charged condition comprises silver oxides and in its fully discharged condition comprises silver, an electrolyte comprising a water solution of an alkali hydroxide and a negative electrode in which the active material in its charged condition comprises metallic iron, said cell being sealed so that the gases being developed within the cell are brought in contact with the negative as well as the positive electrode.

4,011,366

ELECTRIC CELLS

Roger John Bones, Abingdon, and John Richard Harbar, Wantage, both of England, assignors to United Kingdom Atomic Energy Authority, England

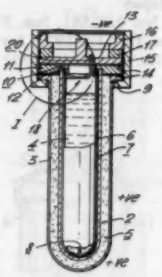
Filed May 11, 1976, Ser. No. 685,424

Claims priority, application United Kingdom, May 22, 1975, 22389/75

Int. Cl.² H01M *2/00*

U.S. Cl. 429—61 **9 Claims**

1. An electric cell comprising a solid electrolyte which partially bounds on one side a compartment containing liquid sodium and on the other side a compartment containing liquid sulphur impregnated in a graphite felt, and a circuit breaking means connected inside the cell in series in the internal electric circuit of the cell, said circuit breaking means being responsive both to the temperature within the cell and to the electric current carried by the cell and being arranged to



interrupt the internal electric circuit upon either the temperature or the current reaching a predetermined value.

4,011,367

SODIUM-SULPHUR ELECTRIC CELLS

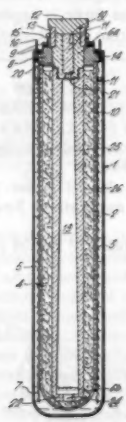
Leslie Samuel Evans, Reading; Trevor Leslie Markin, Goring-on-Thames, and Roger John Bones, Abingdon, all of England, assignors to The Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, England

Filed June 17, 1976, Ser. No. 696,895

Claims priority, application United Kingdom, June 23, 1975, 26628/75

Int. Cl.² H01M *10/00*

U.S. Cl. 429—104 **7 Claims**



1. A sodium-sulphur electric cell having a compartment containing liquid sulphur bounded at least in part by one side of a solid electrolyte, a compartment containing liquid sodium on the other side of the solid electrolyte, and a current collecting means extending into the liquid sulphur compartment, wherein the improvement comprises a current collecting means of hollow form, the current collecting means containing an expansion space therewithin for products arising from reaction of sodium and sulphur, and port means provided in the current collecting means and connected between the liquid sulphur compartment and the expansion space to provide for flow of said products into and out of the expansion space.

4,011,368

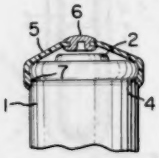
WATERTIGHT BATTERY CAP

Kenichi Mabuchi, Tokyo, Japan, assignor to Mabuchi Motor Co. Ltd., Tokyo, Japan

Continuation of Ser. No. 438,581, Jan. 31, 1974, abandoned. This application July 10, 1975, Ser. No. 594,798

Int. Cl.² H01M 6/02

U.S. Cl. 429—121 **4 Claims**



1. An improved watertight battery and cap combination comprising:

a first battery having a first terminal at the center of one end face thereof, a second terminal at the opposed end thereof and a peripheral groove formed on the outside surface proximate the end thereof adjacent the first terminal,

a movable cap having a first cylindrical portion that surrounds a portion of the periphery of said battery, an inwardly directed lip at one end of said cylindrical portion, said lip engaging the peripheral groove in said battery and a resilient, substantially convex end wall integral with said cylindrical portion at a location axially spaced from the plane of said lip and capable of being moved inwardly towards said first battery terminal upon the application of a force; and

a conductive terminal integral with and extending through said end wall of said battery cap and in opposition to one of said battery terminals, said terminal being normally spaced from and capable of contacting said first battery terminal when the force is applied to said end wall but being insulated from said second battery terminal.

4,011,369

ELECTRIC STORAGE BATTERY ELECTRODE, AND METHOD FOR ITS MANUFACTURE

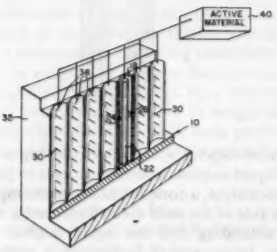
Erik G. Sundberg, Nol, Sweden, assignor to Aktiebolaget Tudor, Sundbyberg, Sweden

Filed Feb. 20, 1975, Ser. No. 551,327

Claims priority, application Sweden, Feb. 22, 1974, 7402348

Int. Cl.² H01M 2/16

U.S. Cl. 429—140 **10 Claims**



1. A plate electrode for a storage battery containing a plurality of tubes connected together to define a plane for said electrode with each of said tubes comprising an outer sheath of electrical insulating, electrolyte-permeable material filled with active material and a rod of electrically conducting material disposed in the center thereof and characterized in that for centering the conductive rod, said rod is provided solely with centering fins formed integrally with the rod which project radially from the center of the rod, with all of said centering fins lying solely in a direction substantially parallel to the plane of said electrode.

4,011,370

METHODS AND APPARATUS FOR CLOSING THE BOTTOM ENDS OF ELECTRODE TUBES

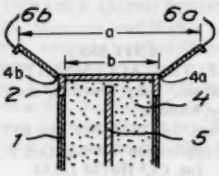
Gunnar Eckerbom, Kungalv, Sweden, assignor to Aktiebolaget Tudor, Sundbyberg, Sweden

Filed June 2, 1976, Ser. No. 692,119

Claims priority, application Sweden, Feb. 6, 1975, 7506254

Int. Cl.² H01M 35/12

U.S. Cl. 429—140 **7 Claims**



1. A closure strip for covering the bottom ends of battery electrode tubes, said bottom strip comprising:

a base mounted on the bottom ends of the electrode tubes joining said electrode tubes together, and

at least one movable closure section joined to said base, said movable closure section being movable from an open position allowing the tubes to be filled with active material to a closed position closing the bottom ends of said electrode tubes.

4,011,371

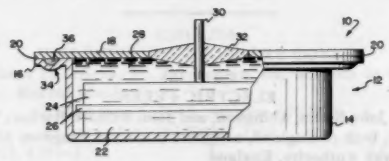
MEANS FOR DETECTING AND NEUTRALIZING LEAKS IN ELECTROCHEMICAL CELLS

Joseph L. Hallett, Seneca Falls; Peter H. Rollason, Cayuga, and Thaddeus V. Rychlewski, Seneca Falls, all of N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Dec. 17, 1975, Ser. No. 641,487

Int. Cl.² H01M 2/08

U.S. Cl. 429—174 **7 Claims**

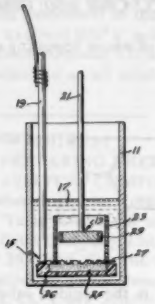


1. An electrochemical cell comprising: a container having a substantially cup-shaped portion and a lid therefor peripherally sealed to said cup-shaped portion; a positive and a negative electrode within said sealed container; a corrosive electrolyte within said sealed container and encompassing said electrodes; and means associated with said seal and forming an integral part with said container including a neutralizing agent for said corrosive electrolyte in the event of a leak, said integral part comprising a depression formed in a flange of said cup-shaped portion.

4,011,372
METHOD OF PREPARING A NEGATIVE ELECTRODE INCLUDING LITHIUM ALLOY FOR USE WITHIN A SECONDARY ELECTROCHEMICAL CELL

Zygmunt Tomczuk, Palos Hills; Theodore W. Olszanski, Roselle, and James E. Battles, Oak Forest, all of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Dec. 9, 1975, Ser. No. 639,133
Int. Cl.² H01M 4/40
U.S. Cl. 429—218 **10 Claims**



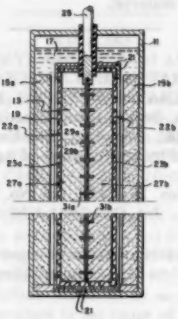
1. A method of preparing an electrode including a lithium alloy as active material for use as a negative electrode within a secondary electrochemical cell, said cell also including a positive electrode and a molten salt electrolyte, said method comprising preparing a melt of lithium alloy selected from the group of lithium-aluminum, lithium-silicon and lithium-magnesium; immersing a porous substrate of electrically conducting metal within said melt; removing said substrate from said melt to completely solidify adherent lithium alloy within at least a portion of the void volume of said substrate; and assembling said substrating with completely solidified lithium alloy within said electrochemical cell.

4,011,373
UNCHARGED POSITIVE ELECTRODE COMPOSITION

Thomas D. Kaun, Lisle; Donald R. Vissers, Naperville, and Hiroshi Shimotake, Hinsdale, all of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 29, 1976, Ser. No. 681,649
Int. Cl.² H01M 35/02
U.S. Cl. 429—218 **7 Claims**

1. An unchanged electrode composition for use in a positive electrode within a secondary electrochemical cell opposite to a negative electrode containing a material capable of alloying with lithium to produce an alloy of higher melting point than that of lithium metal, said negative electrode material being selected from the group of aluminum and silicon or their ternary alloys, said positive electrode composition comprising a transition metal, lithium sulfide, and a compound selected

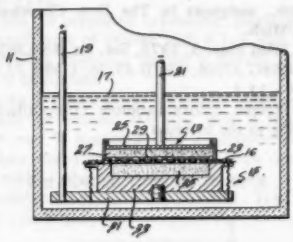


from alkali metal and alkaline earth metal compounds consisting of the nitrides and carbides.

4,011,374
POROUS CARBONACEOUS ELECTRODE STRUCTURE AND METHOD FOR SECONDARY ELECTROCHEMICAL CELL

Thomas D. Kaun, Lisle, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Dec. 2, 1975, Ser. No. 636,882
Int. Cl.² H01M 4/36
U.S. Cl. 429—220 **16 Claims**



1. An improved electrode for use in a high-temperature, secondary electrochemical cell including a molten salt electrolyte, said electrode comprises a solid, porous matrix of thermosetting, carbonaceous material of about 50–65% porosity having solid particles of metal sulfide selected from the group consisting of sulfides of iron, cobalt, nickel and copper, fixedly embedded therein in a generally uniform distribution and exposed to interstitial volume within said porous matrix.

4. A paste composition for forming an electrode for use in a high-temperature, secondary electrochemical cell, said paste composition comprising a thermosetting material in liquid form, particulate active material and solid volatile in a generally uniform mixture, said particulate active material being selected from the group consisting of sulfides of iron, cobalt, nickel and copper and said solid volatile being about 50–65% of the total volume of paste constituents.

11. A method of preparing an electrode including a particulate active material selected from the group consisting of sulfides of iron, cobalt, nickel and copper for use in a high-temperature, secondary electrochemical cell, said method comprising blending thermosetting carbonaceous material in liquid form with the particulate active material and solid volatile to form a generally uniform paste, said solid volatile being provided in sufficient amount to be about 50–65% of the

total volume of paste constituents; and heating said paste to transform said volatile to vapor and to cure said thermosetting, carbonaceous material into a rigid, porous matrix containing said active material.

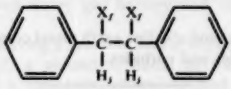
4,011,375

PHOTODEGRADABLE PLASTICS CONTAINING HALOGENATED DIPHENYL ETHANES

Bernard Freedman, Berkeley, and Martin J. Diamond, Oakland, both of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Nov. 26, 1974, Ser. No. 527,400
Int. Cl.² C08J 3/20
U.S. Cl. 526—1 **2 Claims**

1. A photodegradable composition comprising a polyolefin and about from 0.1 to 10% of an additive of the structure



wherein:

Each X is chlorine, bromine, or iodine,
f is 1 or 2, and
j is 2 − *f*.

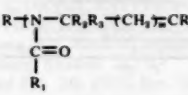
4,011,376

NOVEL REACTION PRODUCTS OF ALLYL HALIDES OR VINYLBENZYL HALIDES WITH OXAZOLINES (OR OXAZINES)

Donald A. Tomalia, and Elizabeth A. Zubritsky, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Mar. 3, 1975, Ser. No. 554,381
Int. Cl.² C08G 33/06; C07D 85/36; C08G 33/02, 45/00
U.S. Cl. 526—11.1 **10 Claims**

1. A methylene chloride-soluble composition of matter corresponding to the formula



wherein

R is allyl or m- and/or p-vinylbenzyl
R_1 is hydrogen, alkyl of 1 to 24 carbon atoms or phenyl;
R_2–R_5 are hydrogen, lower alkyl or lower-hydroxyalkyl with the proviso that at least two of R_2–R_5 are hydrogen;
m is 0 or 1;
n is an integer of at least 1; and
X Chloro bromo iodo or hydroxy.

4,011,377

ENZYME SEPARATION

Peter Duncan Goodearl Dean, 43 Redgate, Formby, Lancashire, and Christopher Robin Lowe, 'Fairlight', 238 Windsor Road, Maidenhead, Berkshire, both of England

Division of Ser. No. 469,221, May 13, 1974, which is a continuation of Ser. No. 224,528, Feb. 8, 1972, abandoned. This application Sept. 4, 1975, Ser. No. 610,152
Int. Cl.² C08F 120/052, 8/40; C08C 19/24
U.S. Cl. 526—13 **9 Claims**

1. A reactive matrix consisting essentially of adenosine triphosphate chemically attached to a water insoluble organic polymeric support material, said reactive matrix being free from chemically attached enzymes, and said water insoluble organic polymeric support material containing said adenosine triphosphate attached thereto being capable of attracting enzymes in affinity chromatography which are attracted to said adenosine triphosphate, thereby making it possible to separate enzymes from other components of a liquid medium containing said enzymes as well as other enzymes.

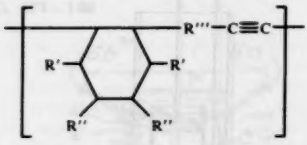
4,011,378

AROMATIZED POLYACETYLENES

Dwain M. White, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed June 29, 1972, Ser. No. 267,389
Int. Cl.² C08F 9/00; C08G 25/00
U.S. Cl. 526—19 **8 Claims**

1. A polymer all of whose repeating units have the formula



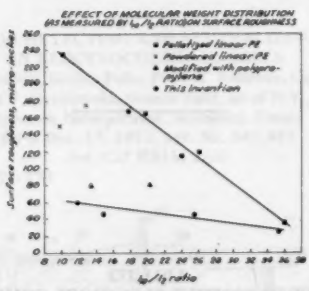
wherein each R''' is the residue other than an ethynylene group of a solvent-soluble polyacetylene, each R', independently, is lower alkyl, lower alkoxycarbonyl, phenyl or halophenyl and each R'', independently, is phenyl or halophenyl.

4,011,379

ELECTRICAL INSULATION FROM LIGHTLY CHLORINATED, HIGH BULK DENSITY OLEFIN POLYMER

Kenneth E. Bow, and James D. MacRae, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 22, 1975, Ser. No. 580,095
Int. Cl.² C08F 8/22, 10/02, 110/02
U.S. Cl. 526—22 **4 Claims**


EFFECT OF MOLECULAR WEIGHT DISTRIBUTION (AS MEASURED BY I_{10}/I_2 RATIO) ON SURFACE ROUGHNESS
Surface roughness, micro-inches
Pelletized linear PE
Powdered linear PE
Modified with polypropylene
This invention
I_{10}/I_2 ratio

1. Electrical insulation formed from a normally solid, linear polyethylene containing from about 1 to about 20 percent by weight chlorine chemically combined therewith said polyethylene having a bulk density of from about 22 to about 36 pounds per cubic foot and wherein the individual particles of said polymer are predominently in the range of from about 300 to about 800 microns in size, said polyethylene additionally being characterized by a melt index of from about 0.05 to about 2 as determined by ASTM Test No. D-1238, Procedure A and a tensile yield strength of greater than about 1000 p.s.i. wherein said polyethylene is chlorinated by reacting said polyethylene while in substantially dry, powdered form with gaseous chlorine in the substantial absence of oxygen at tem-

peratures not substantially exceeding 90° C, while holding said polyethylene in a fluidized bed state.

4,011,380

OXIDATION OF POLYMERS IN PRESENCE OF BENZENE SULFONIC ACID OR SALT THEREOF

Charles T. West, Naperville, and George S. Culbertson, Downers Grove, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Dec. 5, 1975, Ser. No. 637,886
Int. Cl.² C08F 8/06, 8/32
U.S. Cl. 526—30 21 Claims

1. The process of oxidizing copolymers of ethylene and olefinically unsaturated monomers in the temperature range of from about −40° F. to about 800° F. in the presence of from about 0.01 weight percent to about 5.0 weight percent based on copolymer/oil solution, of an oil soluble benzene sulfonic acid or salt thereof.

4,011,381

PROCESS FOR PREPARING THERMOSETTING POWDER COATING COMPOSITION

Naozumi Iwasawa; Nobuo Sugiyama; Ichiro Yoshihara; Tadashi Watanabe, and Taizo Kondo, all of Hiratsuka, Japan, assignors to Kansai Paint Company, Ltd., Amagasaki, Japan

Filed May 28, 1975, Ser. No. 581,430
Claims priority, application Japan, June 4, 1974, 49-63218
Int. Cl.² C08F 220/14
U.S. Cl. 526—56 15 Claims

1. A process for preparing a thermosetting powder coating composition comprising the steps of copolymerizing 5 to 25 wt.% of at least one member selected from the group consisting of glycidyl acrylate and glycidyl methacrylate with 95 to 75 wt.% of an ethylenically unsaturated compound in a solvent having a boiling point of up to 170° C to obtain a solution of copolymer, the copolymer having a number average molecular weight of 2,000 to 30,000 and a melt viscosity of 100 to 500 poises at 160° C, uniformly dispersing a pigment into the copolymer solution, removing the solvent from the resulting mixture at a temperature of 170° to 220° C and reduced pressure not to exceed 0.5 wt.% of residual solvent, thereafter admixing a di- or tri-carboxylic acid cross-linking agent with the mixture with heating at a temperature of up to 120° C, and pulverizing the solid mixture obtained.

4,011,382

PREPARATION OF LOW AND MEDIUM DENSITY ETHYLENE POLYMER IN FLUID BED REACTOR

Isaac J. Levine, Somerville, and Frederick J. Karol, Bellemead, both of N.J., assignors to Union Carbide Corporation, New York, N.Y.

Filed Mar. 10, 1975, Ser. No. 557,122
Int. Cl.² C08F 2/34, 4/16, 4/24, 10/00
U.S. Cl. 526—96 10 Claims

1. A process for producing solid ethylene polymers having a density of less than 0.941 and a melt index of ≥0.0 to at least about 2.0 under relatively low pressure conditions which comprises

copolymerizing ethylene with sufficient quantities of C_3 to C_8 α-olefin monomer to provide the desired density in the copolymer product

in a fluid bed process at a temperature of about 30° to 105° C., under a pressure of less than about 1000 psi, and under a mass gas flow rate of about 1.5 to 10 times G_{mf}

by contacting the monomers with fluidized particles of a supported catalyst wherein said particles have an average diameter of about 50 to 200 microns

said supported catalyst having been activated in air or oxygen at a temperature of about 300° to 900° C., and comprising, based on the total weight of the support and the catalyst,

about 0.05 to 3.0 weight percent of chromium,

about 1.5 to 9.0 weight percent of titanium, and

>0.0 to about 2.5 weight percent of fluorine, said chromium and said titanium being in the form of oxides after said activation.

4,011,383

TETRA(NEOPHYL) ZIRCONIUM AND ITS USE IN PROCESS FOR THE POLYMERIZATION OF OLEFINS

Robert Alton Setterquist, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 471,813, May 20, 1974, Pat. No. 3,932,307. This application July 30, 1975, Ser. No. 600,297
Int. Cl.² C08F 2/06, 4/64, 10/02, 10/06
U.S. Cl. 526—154 11 Claims

1. A process for the polymerization or copolymerization of at least one olefinic monomer, selected from the group consisting of ethylene, higher 1-olefins and conjugated diolefins, to produce solid, linear polyolefins which comprises contacting at least one olefinic monomer in an inert hydrocarbon medium, at a temperature in the range of 10° to 300° C. and at a pressure high enough to keep the monomer in solution at the temperature employed, with a catalyst consisting essentially of neophyl zirconium aluminate bonded onto the surfaces of activated, fumed alumina.

4,011,384

PROCESS FOR THE PRODUCTION OF CRYSTALLINE TERPOLYMERS OF ETHENE, BUTENE-1 AND BUTENE-2

Fritz Baxmann; Johann Dietrich; Walter Dittmann, and Albert Frese, all of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed June 10, 1975, Ser. No. 585,698
Claims priority, application Germany, June 29, 1974, 2431353
Int. Cl.² C08F 210/08
U.S. Cl. 526—158 5 Claims

1. A process for preparing crystalline, thermoplastic, low-pressure terpolymers of ethene with 0.1–5 mol % butene-1 and 0.1–3 mol % butene-2 having a density of 0.94–0.96 g./cm³, which comprises:

polymerizing a liquid phase monomer mixture consisting essentially of ethene, 0.05–10 mol % butene-1 and 20–98.9 mol % butene-2 with a catalytic amount of a particulate mixed polymerization catalyst comprising

a. $TiCl_3 \cdot nAlCl_3$ wherein n is 0.2–0.6, and

b. isoprenylaluminum in a molar ratio Al : Ti of about 2–20 to form said terpolymer.

4,011,385

POLYMERIZATION OF OLEFINS

Long Shyong Wang, Stamford, and Erwin Richard Ruckel, Darien, both of Conn., assignors to Arizona Chemical Company, Wayne, N.J.

Filed May 12, 1975, Ser. No. 576,936
Int. Cl.² C08F 36/08
U.S. Cl. 526—190 13 Claims

1. A process for polymerizing an olefin selected from the group consisting of isobutylene, isoprene, piperylene, alpha-pinene, beta-pinene, camphene, dipentene, limonene, and mixtures thereof, which comprises the steps of: establishing a catalyst system consisting essentially of a mixture of an alkyl germanium halide or an aryl germanium halide, or an alkyl germanium alkoxide and aluminum chloride or aluminum bromide or mixtures of the latter in an inert solvent, adding at a temperature between about minus 30° and about plus 30° C an olefin selected from the group consisting of isobutylene, isoprene, piperylene, alpha-pinene, beta-pinene, camphene, dipentene, limonene, and mixtures thereof incrementally with agitation, adjusting and maintaining the temperature of the mixture at about minus 30° to about plus 30° C for from about 1 to about 4 hours, quenching the latter mixture with an aqueous solution, separating aqueous phase from the hydrocarbon phase, and recovering a solid polymer therefrom.

4,011,386

PROCESS FOR PRODUCING POLYMERS OR COPOLYMERS OF NORBORNENE-CARBOXYLIC ACID AMIDES

Shuichi Matsumoto, Yokohama; Ryuichi Nakamura, Tokyo; Seiji Fukuhara, Kawasaki; Kazuo Suzuki, Yokohama, and Koei Komatsu, Tokyo, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

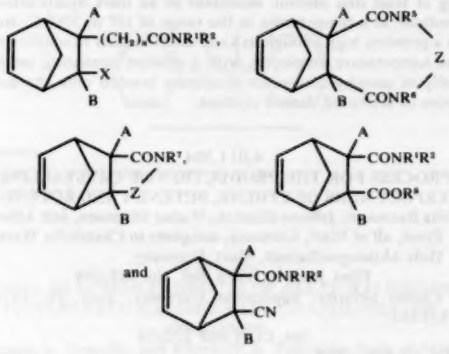
Filed Sept. 4, 1974, Ser. No. 503,209

Claims priority, application Japan, Sept. 5, 1973, 48-99966

Int. Cl.[2] C08F *26/06*

U.S. Cl. 526—259 **6 Claims**

1. A polymer obtained by ring-opening polymerization of (I) at least one compound selected from the group consisting of monomers represented by the formula,



wherein R^1 and R^2 are independently a hydrogen atom or a saturated or unsaturated hydrocarbon group having 1 to 10 carbon atoms; X is a hydrogen atom, an alkyl group having 1 to 10 carbon atoms or a group of the formula;

$$(CH_2)_m\ CONR^3R^4$$

wherein R^3 and R^4 are independently a hydrogen atom or a saturated or unsaturated hydrocarbon group having 1 to 10 carbon atoms; R^1 R^2, R^3 and R^4 may be the same or different; R^5, R^6 and R^7 are independently a hydrogen atom or a saturated or unsaturated hydrocarbon group having 1 to 10 carbon atoms; A and B are independently an alkyl group having 1 to 10 carbon atoms or a cycloalkyl, aralkyl or aryl group having up to 20 carbon atoms, and may be the same or different; Z is an alkylene group having 1 to 10 carbon atoms; and *n* and *m* are independently an integer of 0 to 10.

4,011,387

ADHESIVE RESINS AND METHOD OF PRODUCTION THEREOF

Julius Curts, and Hanns Pietsch, both of Hamburg, Germany, assignors to Beiersdorf Aktiengesellschaft, Hamburg, Germany

Filed July 23, 1975, Ser. No. 598,533

Claims priority, application Germany, Aug. 8, 1974, 2438125

Int. Cl.[2] C08F *32/06*

U.S. Cl. 526—281 **8 Claims**

1. A resin comprising a polymer of the monomer dimethyl-di-(cyclohexen-3)-yl-methane having a softening point in the range of about 70° to 150° C. and a number average molecular weight of about 800 to about 1200.

4,011,388

PROCESS FOR PREPARING EMULSIONS BY POLYMERIZATION OF AQUEOUS MONOMER-POLYMER DISPERSIONS

Charles Vincent Murphy, and David William Zunker, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 485,271, May 2, 1974, Pat. No. 3,953,386. This application Oct. 28, 1975, Ser. No. 626,028

Int. Cl.[2] C08L *1/10, 1/18*

U.S. Cl. 526—320 **19 Claims**

1. Process for the preparation of an aqueous polymer emulsion which comprises mixing water, surfactant, at least one polymer and at least one monomer, the polymer being soluble in said monomer, to form a dispersion of polymer-monomer particles in water; then subjecting said dispersion to conditions such that the monomer within the particles becomes polymerized by free radical polymerization thereby forming a substantially homogeneous blend of at least two polymers within the particles of the emulsion.

4,011,389

GLYCOSIDE POLYETHERS

William K. Langdon, Grosse Ile, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Mar. 21, 1975, Ser. No. 560,728

Int. Cl.[2] C07H *15/04*

U.S. Cl. 536—4 **7 Claims**

1. A material having the formula

$$RO-(C_6H_{10}O_5)_n-R^1$$

in which

$(C_6H_{10}O_5)$ represents a glycosyl unit;

n is an integer from 1 to 20;

R is selected from the group consisting of 2-hydroxypropyl, 2-hydroxyethyl, glyceryl, methyl, ethyl, n-propyl, isopropyl, n-butyl, sec-butyl, methoxethyl, and ethoxyethyl, said R being joined to a glycosyl unit through an acetal linkage;

R^1 is selected from the group consisting of

$$-OCH_2-CHOH-R^2,$$

$$-OCH_2-CHOH-CH_2OR_3,$$

$$-OCH_2-CHOH-CH_2-\left(O-\underset{H}{\overset{R^4}{C}}-CH_2-\right)_p-OR^5,$$

$$-OCH_2-CHOH-CH_2-(O-CH_2-CH_2-)_q-O-\text{C}_6\text{H}_4(R^6)$$

and

$$-O-M-O-(C_6H_{10}O_5)_n-OR;$$

R^2 is an alkyl group containing 6 to 18 carbon atoms;

R^3 is an alkyl group containing 6 to 18 carbon atoms;

R^4 is selected from the group consisting of methyl and ethyl;

R^5 is an alkyl group containing 1 to 6 carbon atoms;

R^6 is an alkyl group containing 4 to 20 carbon atoms;

p is an integer of from 3 to 20;

q is an integer of from 0 to 20;

M is a hydrophobic chain of 6 to 40 units selected from the group consisting of oxypropylene and oxypropylene-oxyethylene units wherein the oxypropylene content of said hydrophobic chain is from about 75 to 100 weight percent and the oxyethylene content is from 0 to 25 weight percent; and

R^1, R^2, R^3, R^4, R^5, R^6, M, p and q are so selected as to provide that the molecular weight attributable to R^1 equals 10 to 80 percent of the molecular weight attributable to the entire molecule.

4,011,390

SEMI-SYNTHETIC AMINOCYCLITOL AMINOGLYCOSIDE ANTIBIOTICS AND METHODS FOR THE PREPARATION THEREOF

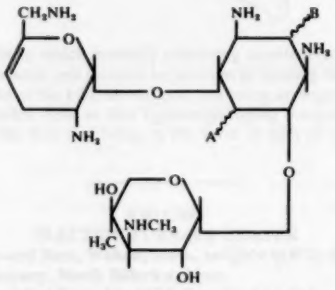
Marvin J. Weinstein, East Brunswick; Peter J. L. Daniels, Cedar Grove; Gerald H. Wagman, East Brunswick, and Raymond Testa, Verona, all of N.J., assignors to Schering-Plough Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 443,052, Feb. 15, 1974, abandoned. This application June 5, 1974, Ser. No. 476,638

Int. Cl.² C07H *15/22*

U.S. Cl. 536—17 **6 Claims**

1. A compound selected from the group consisting of compounds of the formula:



and the non-toxic acid addition salts thereof wherein A is a member selected from the group consisting of hydrogen, amino, hydroxy and (C_1–C_8) alkoxy, B is a member selected from the group consisting of hydrogen, and hydroxy, wherein the wavy lines connecting A and B to the ring nucleus denotes that such groups may be in any of the possible, stereoisomeric forms, with the proviso that when B is hydrogen and A is hydroxyl, A must be cis to the glycosyl groups adjacent thereto and the further proviso that when A is amino, it must be trans to the glycosyl groups adjacent thereto.

4,011,391

VALIDAMYCIN C, D, E AND F ANTIBIOTICS

Satoshi Horii; Yukihiko Kameda, both of Osaka; Takashi Iwasa, Kyoto, and Hiroichi Yamamoto, Kobe, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Apr. 18, 1972, Ser. No. 245,135

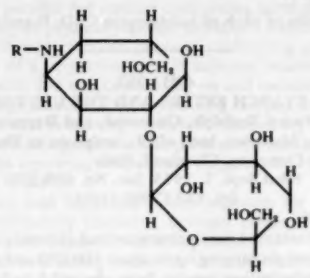
Claims priority, application Japan, Aug. 20, 1971, 46-25419; Aug. 27, 1971, 46-27758

Int. Cl.² C07H *15/00*

U.S. Cl. 536—17 **5 Claims**

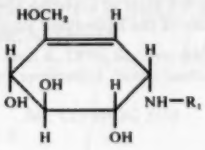
1. A pure antibiotic selected from the group consisting of

a. pure validamycin C of the formula



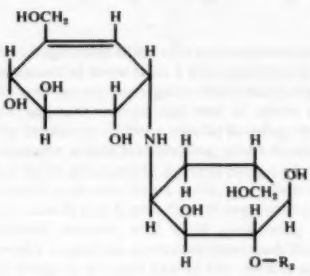
wherein R is O-α-D-glucopyranosyl-3-hydroxymethyl-4,5,6-trihydroxy-2-cyclohexenyl, and decomposing at 142° to 160° C.

b. pure validamycin D of the formula



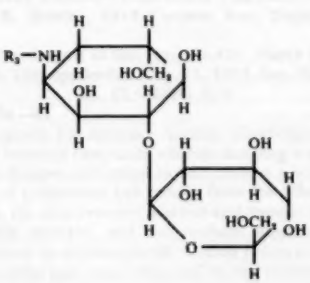
wherein R_1 is O-α-D-glucopyranosyl-2,3,4-trihydroxy-5-hydroxy-methyl-cyclohexyl, and having the optical rotation $[\alpha]_D(H_2O) = +169.3°$,

c. pure validamycin E of the formula



wherein R_2 is O-α-D-glucopyranosyl-O-β-D-glucopyranosyl, and having the optical rotation of $[\alpha]_D(H_2O) = +148.2°$,

d. pure validamycin F of the formula



wherein R_3 is O-α-D-glucopyranosyl-3-hydroxymethyl-4,5,6-trihydroxy-2-cyclohexenyl, and having the optical

rotation $[\alpha]_D(H_2O) = +130.7°$ and decomposing at 165° to 173° C,

and acid salts of each of validamycin C, D, E and F.

4,011,392

MIXED STARCH ESTERS AND THE USE THEREOF

Stephen Edward Rudolph, Glenwood, and Raymond Charles Glowaky, Matteson, both of Ill., assignors to The Sherwin-Williams Company, Cleveland, Ohio

Filed Sept. 2, 1975, Ser. No. 609,327
Int. Cl.² C08B *31/06*
U.S. Cl. 536—108 **43 Claims**

1. Mixed esters of starch characterized as having an average molecular weight ranging up to about 100,000 and an average degree of substitution ranging from about 0.5 to 3.0 wherein at least about 0.1 of the total degree of substitution consists of ester groups having pendant carboxyl groups; said esters of starch derived from

a. low molecular weight hydrolyzed starch and the derivatives thereof having a plurality of anhydroglucose units and

b. at least about 0.5 mole of acylating agent for each anhydroglucose unit of the hydrolyzed starch and the derivatives thereof;

said acylating agent consisting of (i) from about 0.1 to 2.9 moles of at least one anhydride of a polycarboxylic acid and (ii) from about 0.1 to 2.9 moles of at least one agent selected from the class consisting of anhydrides of monocarboxylic acids and the acyl halides of monocarboxylic acids.

4,011,393

POLYGALACTOMANNAN GUM FORMATE ESTERS

Louis E. Trapasso, Watchung, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Apr. 28, 1975, Ser. No. 572,049
Int. Cl.² C08B *37/00*
U.S. Cl. 536—114 **4 Claims**

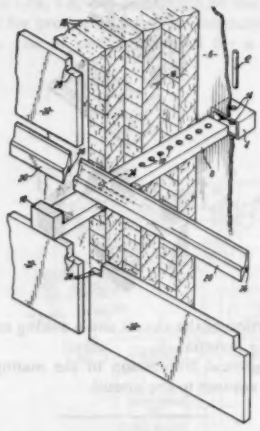
1. A process for producing polygalactomannan gum formate esters which consists essentially of contacting solid polygalactomannan gum with concentrated formic acid solution, and a fluid organic medium which is a solvent for formic acid and essentially a non-solvent for solid polygalactomannan gum at a temperature between 0° and 60° C., and wherein the contact time is for a period sufficient to provide a predetermined degree of substitution by formate groups in the polygalactomannan gum.

4,011,394

KILNS

Donald Percy Shelley, Oulton Grange, Oulton near Stone, England

Filed July 9, 1975, Ser. No. 594,524
Claims priority, application United Kingdom, July 16, 1974, 31533/74
Int. Cl.² H05B 3/16
U.S. Cl. 13—20 4 Claims



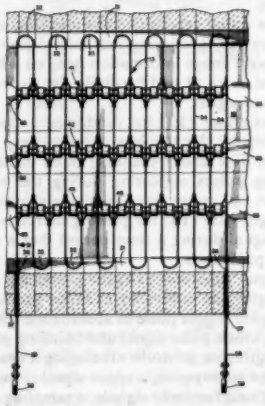
1. A kiln in which inwardly extending cantilevered support ties are located and secured in position in holding devices on the outside of the kiln, the support ties being arranged so as to carry ceramic fibre or like lightweight lining material on the inside of the kiln and being in the form of bars of refractory material.

4,011,395

ELECTRIC FURNACE HEATER

Jacob Howard Beck, Waban, Mass., assignor to BTU Engineering Company, North Billerica, Mass.

Filed Sept. 15, 1975, Ser. No. 613,416
Int. Cl.² H05B 3/06
U.S. Cl. 13—25 10 Claims



1. A generally rectangular, grate-like high temperature, self-supporting electrical resistance heater adapted for generally horizontal suspension within a high temperature furnace comprising:

an elongated flat continuous resistor ribbon folded to provide a sinuous planar arrangement of a plurality of spaced longitudinal beam-like heater segments having substantially parallel flat vertical confronting surfaces;

a plurality of physically distinct refractory insulators at least one of each disposed between confronting parallel surfaces of a respective pair of adjacent beam-like heater segments and supported solely on said resistor ribbon for spacing said respective confronting surfaces one from the other, said refractory insulators maintaining said beam-like heater segments in said parallel relationship throughout the operating temperature range of said high temperature heater;

means on said beam-like heater segments for supporting said refractory insulators between confronting parallel surfaces of adjacent heater segments; and

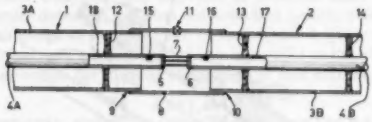
electrical connecting means for connection of the respective outer ends of said continuous resistor ribbon to an external electrical power source.

4,011,396

GAS-FILLED HIGH-VOLTAGE CABLE BUILT UP OF RIGID SEGMENTS

Gijsbrecht Coenraad Van Deventer, Delft, and Gerard Adriaan Visser, Beemster, both of Netherlands, assignors to N.K.F. Kabel B.V., Delft, Netherlands

Filed Dec. 6, 1974, Ser. No. 530,282
Claims priority, application Netherlands, Dec. 12, 1973, 7316991
Int. Cl.² H02G 5/06
U.S. Cl. 174—11 R 1 Claim



1. A high voltage cable filled with an insulation gas under an operating pressure of more than 1 Bar, comprising a plurality of segments and means for rigidly interconnecting said segments, each segment comprising one or more conductors supported by insulators within a tubular housing, an insulating gas under pressure within said housing, and a blocking device comprising a valve arranged to prevent escape of gas prior to assembly of said segments into a cable, and when pressure in the segment exceeds that in an adjacent segment by more than a predetermined amount; said valve comprising means for biasing the valve toward an open condition such that the valve opens when pressure on each side of the valve is equal, and a stem arranged to reclose when pressure in the segment exceeds that in an adjacent segment by more than a predetermined amount.

4,011,397

VIBRATION DAMPER FOR HIGH VOLTAGE CABLES

Raymond R. Bouche, 9419 Cordero Ave., Tujunga, Calif. 91402

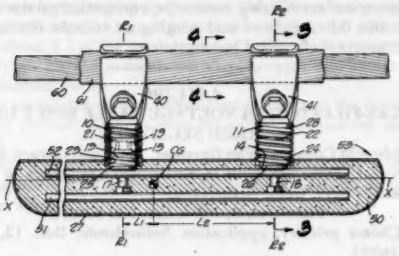
Continuation-in-part of Ser. No. 454,421, March 25, 1974, abandoned. This application Aug. 11, 1975, Ser. No. 603,622
Int. Cl.² H02G 7/14
U.S. Cl. 174—42 41 Claims

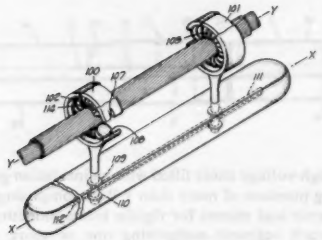
1. In a system for damping Aeolian vibrations in a cable suspended between two points wherein damping is attained by means of a damper connected to said cable at a position near one point of suspension and remote from the other point of suspension, the improvement wherein said damper comprises:

an inertial member, and two resilient support members connected to asymmetrically located points on said inertial member and connecting said inertial member to separate points of said cable.

16. In a device for damping Aeolian vibrations of a suspended cable, the improvement comprising:

a damper having a free vibratory inertial member and having two and only two resilient support members external to said inertial member, said resilient support members having lower ends connected to points of said inertial member between the ends thereof, said resilient support members comprising separate means at the ends thereof remote from said inertial member for separate connection of said resilient support members to separate points of such suspended cable by externally gripping said cable at points distributed over more than half the perimeter of said cable and without forming a passage through said cable, whereby said damper may hang from said cable when connected thereto by said resilient support members with said inertial member at the lower end thereof.





30. A resilient support member adapted for connecting an inertial member to a cable suspended between two points to form a damper for dampening Aeolian vibrations of the cable, the resilient support member comprising:

a clamp portion adapted to partially surround said suspended cable about its top, bottom, and at least one side thereof,

a resilient portion having at least one tubular spring member adapted for connection at a first end to said clamp portion and connected at a second end to said inertial member, and

a rubber-like tubular member compressively nested inside said tubular spring member.

4,011,398

ELECTRICAL CONNECTION TO A CIRCUIT POTTED WITHIN A HOUSING AND METHOD OF SAME

Douglas B. Munz, Glenwood, and William G. Skoda, Oak Park, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 3, 1975, Ser. No. 554,387
Int. Cl.² H05K *1/08*
U.S. Cl. 174—52 PE **16 Claims**

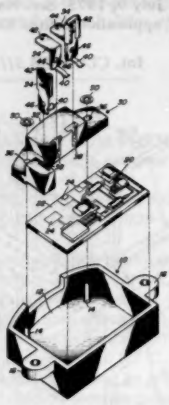
1. A circuit potted within a housing unit wherein the improvement comprises

a subassembly having a terminal and a terminal assembly,

the terminal of electrically conductive material and having a connecting end and a mating end,

the terminal affixed to the terminal assembly,

the subassembly located in the housing via aligning means for positioning the connecting end within the potting material in electrical contacting engagement with a selected portion of the circuit and a mating end external to the potting material,



whereby electrical connection to the mating end effects electrical contact to the circuit.

4,011,399

PHOTOGRAPHIC IMAGE PICK-UP AND CODING SYSTEM OF RUN-LENGTH TYPE

Hiroyoshi Tsuchiya; Yukifumi Tsuda; Heijiro Hayami, and Hiroaki Kotera, all of Kawasaki, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Jan. 30, 1974, Ser. No. 437,986
Claims priority, application Japan, Feb. 1, 1973, 48-13264
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 20, 1976
Int. Cl.² H04N *7/12*
U.S. Cl. 358—261 **2 Claims**

1. A photographic image information pick-up and coding system for picking up and coding photographic image information carried on a recording medium, which comprises:

a record medium having photographic image information thereon;

a facsimile signal generator (**11**) including scanning means for repeatedly producing facsimile signals representing a part of said image information lying on a horizontal scanning line, each of said facsimile signals including at least one space signal;

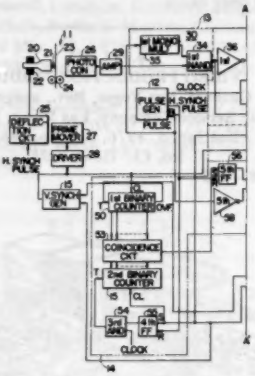
a pulse generator (**12**) for producing a clock pulse signal consisting of clock pulses consecutively appearing at a constant rate and a blanking pulse signal consisting of blanking pulses appearing during the blanking period between two consecutive facsimile signals;

a run-length gate (**16**) for passing therethrough said clock pulse signal during a time period that a run-length gate trigger pulse lasts;

a start signal generator (**14**) for producing a start signal;

a run-length gate controller (**13**) for producting said run-length gate trigger pulse in accordance with said facsimile signals, clock pulse signal and blanking pulse signal, said run-length gate controller including a space signal superposer for superposing a space signal on a leading edge of each of said facsimile signals, a sampling circuit for sampling said mark and space signals with said clock pulse signal, a mark-space selector (**32**) triggered by said start signal for selectively passing therethrough one of the sampled mark and space signals, and run-length trigger pulse generating means for producing said run-length trigger pulse generating means for producing said run-

length gate trigger pulse, said run-length gate trigger pulse rising at the rise of said start signal and decaying at the rise of the first pulse of the sampled one signal passed through said mark-space selector, said run-length gate trigger pulse generating means including a first gate (46) for passing therethrough said one of the sampled mark and space signals from said mark-space selector when triggered by said start signal, an error eliminating pulse generator (72, 73, 74) connected to the output of said first gate for producing an error eliminating pulse lasting from the rise of said start signal for a predetermined



duration slightly longer than the repetition rate of said clock pulse train, a second gate (75) connected to the output of said first gate for allowing pulses from said first gate to pass therethrough while preventing said pulses from passing therethrough when energized by an error eliminating pulse, and a flip-flop circuit for producing said run-length gate trigger pulse rising at the rise of said start signal and decaying at the rise of the leading pulse of the pulses from said second gate; and

a coder (17) for coding the clock pulse passed through said run-length gate.

4,011,400

APPARATUS FOR READING AN OPTICALLY READABLE REFLECTING INFORMATION STRUCTURE

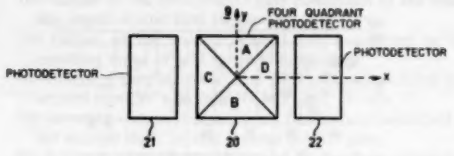
Carel Arthur Jan Simons, and Hendrik' T. Lam, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 4, 1975, Ser. No. 610,329

Claims priority, application Netherlands, July 7, 1975, 7508052

Int. Cl.² G11B 7/00

U.S. Cl. 358—127 **1 Claim**



1. An apparatus for reading a radiation-reflecting record carrier which is provided with information in an optical readable track-shaped information structure, which apparatus is of the type including a radiation source and an objective system for passing radiation from the radiation source to a radiation-sensitive detection system via the record carrier, the improvement wherein the detection system comprises a composite detector consisting of four-sub-detectors, and two further detectors which, viewed in a direction transverse to the effective track direction, are disposed at different sides of the composite detector, and that the detection system is disposed near an image of the exit pupil of the objective system, and a cylindrical lens whose cylinder axis is parallel to the effective track direction for forming said image of said exit pupil.

4,011,401

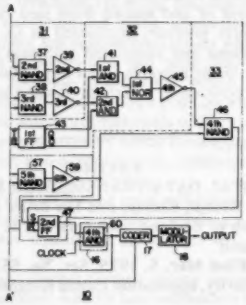
SPECIAL EFFECTS GENERATOR CAPABLE OF REPOSITIONING IMAGE SEGMENTS

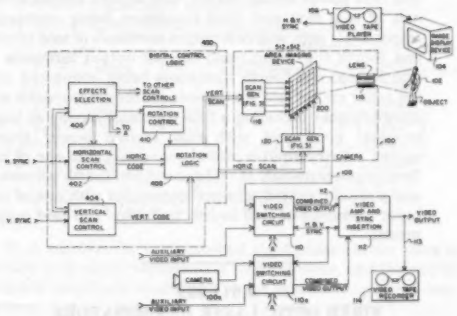
Biagio Presti, Bloomington, Ind., assignor to Sarkes Tarzian, Inc., Bloomington, Ind.

Filed Apr. 25, 1975, Ser. No. 571,521

Int. Cl.² H04N 5/22

U.S. Cl. 358—212 **17 Claims**





1. A video special effects generator comprising:

a plurality of light sensitive elements arranged in an array for receiving light illumination, each of said elements being responsive to light illumination for providing an electrical signal representative of the quantity of light illumination received thereby;

means for individually addressing each one of said elements;

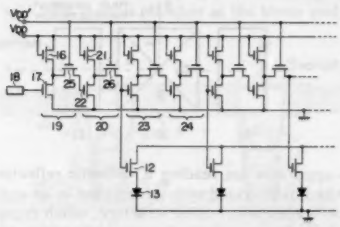
sequencing means coupled to said addressing means for rendering said addressing means operative to address said elements in a predetermined sequence; and

means operatively coupled to said sequencing means for altering said predetermined sequence.

4,011,402
SCANNING CIRCUIT TO DELIVER TRAIN OF PULSES SHIFTED BY A CONSTANT DELAY ONE AFTER ANOTHER

Norio Koike, Musashino; Takamitsu Kamiyama, Kodaira, and Mikio Ashikawa, Koganei, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 19, 1974, Ser. No. 498,656
Claims priority, application Japan, Aug. 24, 1973, 48-94438
Int. Cl.² H04N *3/14*; **H03K** *17/56, 17/60*
U.S. Cl. 358—213 **5 Claims**



3. A scanning circuit comprising:

a circuit means consisting of a plurality of cascade-connected unit circuits, each unit circuit having a first and a second polarity inverting circuits and the output of said first polarity inverting circuit being fed as an input to said second polarity inverting circuit;

a first and a second power source means to supply DC power for each of said unit circuits;

an input means to apply an input signal to the first stage of said circuit means; and

an output means to take out the output of said second polarity inverting circuit of each of said unit circuits;

wherein said first polarity inverting circuit consists of a first and a second transistor and said second polarity inverting circuit consists of a third and a fourth transistors, each said first, second, third and fourth transistors having an input terminal and first and second output terminals and said first output terminal of each of said first and third transistors being commonly connected with one end of said first power source means, said second output terminals of said first and third transistors being connected respectively with said first output terminals of said second and fourth transistors, said second output terminals of said second and fourth transistors being connected with the other end of said first power source means; each unit circuit further including a fifth transistor having an input terminal connected with said second power source means, a first output terminal connected with one of said first output terminals of said second and fourth transistors and a second output terminal connected with one of said input terminals of said fourth transistor and said output means.

4,011,403
FIBER OPTIC LASER ILLUMINATORS

Max Epstein, Highland Park, and Michel E. Marhic, Evanston, both of Ill., assignors to Northwestern University, Evanston, Ill.

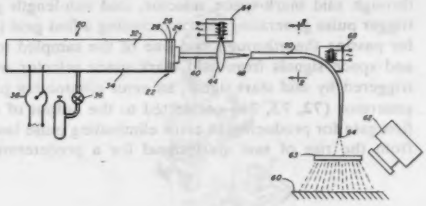
Filed Mar. 30, 1976, Ser. No. 671,750
Int. Cl.² H04N *5/26*
U.S. Cl. 358—209 **21 Claims**

1. Apparatus for providing laser illumination transmitting through an optical fiber for direct visualization of illuminated objects and for photographic recordation, said apparatus comprising

a highly concentrated light source including a laser beam having coherent light characteristics,

an optical fiber

focusing means for directing said laser beam to impinge on said fiber for transmission therealong, and

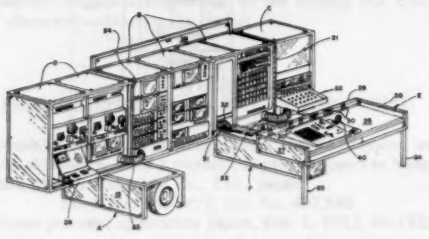


sensing means for visually reproducing objects illuminated by said laser beam.

4,011,404
VIDEO PRODUCTION MODULE

William G. Graham, Las Vegas, Nev., assignor to Las Vegas Convention Service Company, Las Vegas, Nev.

Filed Jan. 5, 1976, Ser. No. 646,854
Int. Cl.² H04N *5/28*
U.S. Cl. 358—185 **16 Claims**

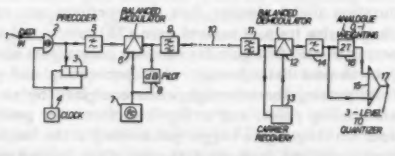


5. In a video production module for housing and transporting video equipment, a supporting frame, a rack frame on said supporting frame containing at least a part of said equipment, a desk in front of and spaced from said rack frame, and a production arm pivotally connected at its one end to said supporting frame and connected with said desk at its other end, said arm being movable about its pivotal connection from a horizontal position to a vertical position adjacent said rack frame.

4,011,405
DIGITAL DATA TRANSMISSION SYSTEMS

Philip Neale Ridout, Elstree, and Ian Bruce Ridout, Thornton Heath, both of England, assignors to The Post Office, London, England

Filed Mar. 5, 1975, Ser. No. 555,571
Claims priority, application United Kingdom, May 17, 1974, 22038/74
Int. Cl.² H04L *27/02*
U.S. Cl. 178—68 **11 Claims**



8. A receiver for digital data including a network through which incoming signal elements are passed, which network includes additive combining means with a plurality of inputs

for signal elements, a plurality of signal paths having gains related by small integers and connected from a common point to the additive combining means, each path transmitting to the additive combining means all signal elements appearing at the common point, at least one signal path including delay means so that the different signal paths respectively imposed fixed delays on signals transmitted through them which differ by integral numbers of the time intervals between the instants of adjacent signal elements, and means for applying received signal elements to the common point and thence to the additive combining means through the plurality of signal paths in parallel, thereby to produce from the additive combining means an output signal having a greater number of levels than the received signal elements.

4,011,406

PCM REGENERATOR

Reginhard Pospischil, Lochham, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

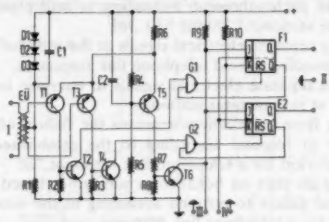
Filed Mar. 19, 1975, Ser. No. 559,631

Claims priority, application Germany, Apr. 10, 1974, 2417644

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² H03K *5/01*; **H04L** *25/20*

U.S. Cl. 178—70 R **4 Claims**



1. A PCM regenerator for pseudoternary-coded signal pulses having an amplitude decision device,

a time decision device,

a pair of input terminals receiving the input pulses which have been corrected for cable attenuation and output terminals where the regenerated pulses which have been regenerated in amplitude and time may be obtained, comprising an input transformer which has a center tapped secondary winding and a primary winding which is connected to said input terminals of the regenerator,

a first pair of pnp transistors which form a push-pull circuit and with their bases, respectively, connected to opposite ends of said secondary winding,

a base voltage divider for the push-pull circuit connected to the center tap of said secondary winding,

a first capacitor connected in parallel with said voltage divider,

a second voltage divider formed of two resistors,

a third pnp-transistor with its base connected to said second voltage divider,

a second capacitor connected in parallel with one of said resistors, the emitter of said third transistor connected to the emitters of said first pair of transistors,

a third resistor connecting said emitters to a positive operating voltage,

a first npn transistor,

the collector of said third transistor connected to the base terminal of said first npn transistor through a fourth resistor,

the emitter of said first npn transistor connected to ground,

the base of said first npn transistor connected to ground through a fifth resistor,

the collector of said first npn transistor connected through a sixth resistor to said operating voltage,

second and third npn transistors with the base of each, respectively, connected to the collectors of said pair of pnp transistors,

the emitters of said second and third npn transistors connected to ground, and their bases connected through seventh and eighth resistors to ground,

first and second NAND gates,

the collector of said second npn transistor connected to the first input terminal of said first NAND gate,

the collector of said third npn transistor connected to the first input terminal of said second NAND gate,

first and second JK flip-flops,

the output of the first NAND gate connected to the resetting input of said first JK flip-flop,

the output of the second NAND gate connected to the resetting input of said second JK flip-flop,

the inverting output of said first JK flip-flop connected to a second input of said first NAND gate,

the inverting output of said second JK flip-flop connected to the second input of said second NAND gate,

the K inputs of the first and second JK flip-flops connected together and through a ninth resistor to the operating voltage,

the pulse train inputs of the first and second JK flip-flops connected together and to the pulse train supply,

the J inputs of said first and second JK flip-flops connected together and to the collector of said first npn transistor and to a pulse train synchronization terminal, and

the Q output of the first JK flip-flop connected to an output terminal, the Q output of the second flip-flop connected to the second output terminal of the regenerator.

4,011,407

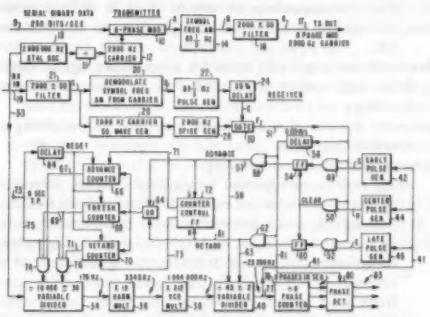
NARROW-BAND EIGHT-PHASE MODEM

Nicholas DiSanti, Staten Island, and Frank Oster, Brooklyn, both of N.Y., assignors to RCA Corporation, New York, N.Y.

Filed Feb. 26, 1976, Ser. No. 661,522

Int. Cl.² H04L *27/22*

U.S. Cl. 178—88 **8 Claims**



7. A receiver for a transmitted eight-phase carrier wave in which each phase represents a tri-bit symbol, and the carrier wave is amplitude modulated at the symbol frequency, comprising

means to derive a symbol frequency pulse wave from said received carrier wave,

means timed by said symbol frequency pulse wave to generate symbol spikes each having the phase of one cycle of the received carrier wave during a respective symbol period,

local means to generate a reference wave, an early pulse wave, and a late pulse wave, all having a frequency equal to eight times the frequency of the carrier wave.

phase lock means to compare each symbol spike with said early and late pulse waves, and for each coincidence cause an advancing or retarding of the phase of said waves,

frequency synchronizing means to count and compare the number of coincidences of said symbol spikes with said early and late pulses, and in cases of imbalance to increase or decrease the frequency of said waves, and

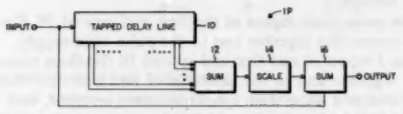
demodulator means to compare each symbol spike with said reference wave to determine the corresponding symbol phase and the corresponding three information bits.

4,011,408

AUDIO TRANSMISSION PROTECTION APPARATUS

Chauncey S. Miller, III, Rancho Palos Verdes, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Dec. 17, 1975, Ser. No. 641,471
Int. Cl.² H04K *1/02*
U.S. Cl. 179—1.5 R **14 Claims**



1. Signal transmission protection apparatus comprising:

a first module, comprising:

delay means to separate an electrical signal, input thereto, into a selected number of primary subsignals, each of said primary subsignals being substantially identical to said electrical signal, each of said primary subsignals further being temporally spaced from said electrical signal and from the remaining primary subsignals; and

arithmetic means to change instantaneous values of said electrical signal by the sum of first fractional parts of the contemporaneous values of each of said primary subsignals, to generate an output from said first module;

transmission means to transmit a resultant signal, derived from said output from said first module, to a remote location;

receiver means, at said remote location, for receiving said resultant signal;

a second module, comprising;

delay means, to separate an electrical signal, introduced thereto, said introduced signal derived from said resultant signal, into a desired number of secondary subsignals, each of said secondary subsignals being substantially identical to said introduced signal, each of said secondary subsignals further being temporally spaced from said introduced signal and from the remaining primary subsignals, said desired number being identical to said selected number, and the temporal spacing between each of said secondary subsignals and said introduced signal being substantially identical to that between the corresponding ones of said primary subsignals and said input signal; and

second arithmetic means to change instantaneous values of said introduced signal by the sum of second fractional parts of the contemporaneous values of said secondary subsignals; wherein:

the arithmetic sign of the activity of said second arithmetic means is opposite to the arithmetic sign of the activity of said first arithmetic means, and said first fractional parts are equal to said corresponding second fractional parts; and

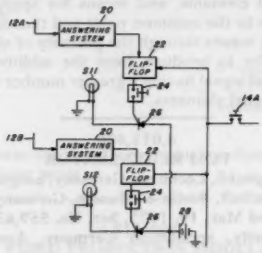
the one of said two modules in which said arithmetic sign is negative further includes means to input said changed values into said delay means thereof.

4,011,409

COMMUNICATION SYSTEM TO MONITOR INDIVIDUAL SUBSCRIBERS

Robert K. Conrad, 432 Morewood Ave., Pittsburgh, Pa. 15213

Filed Apr. 2, 1976, Ser. No. 669,801
Int. Cl.² H04M *11/00*
U.S. Cl. 179—2 A **5 Claims**



1. In a communication system to monitor individual subscribers belonging to a class including superannuated, disabled, sick and medically unstable, a method including the steps of:

establishing time-based periods for telephone link responses between each subscriber belonging to said class and a monitor station,

producing separate electrical signals at the monitor station corresponding to said telephone link responses,

using said separate electrical signals to energize indicator means at said monitor station,

detecting from said indicator means the failure of a subscriber to respond according to the established time-based period for a telephone link response,

providing an alert on behalf of a subscriber based on the detected failure to respond according to the established period for a telephone link response, and

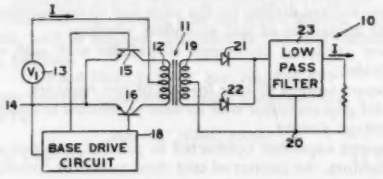
resetting said indicator means at preselected intervals of time corresponding essentially to said time-based periods for a telephone link response.

4,011,410

COMMUNICATION SYSTEM INTERFACE CIRCUITS

Robert M. Thomas, 116 Windsor Drive, Brockville, Ontario, Canada

Filed Nov. 13, 1973, Ser. No. 415,481
Int. Cl.² H04M *3/18*
U.S. Cl. 179—2.5 R **13 Claims**



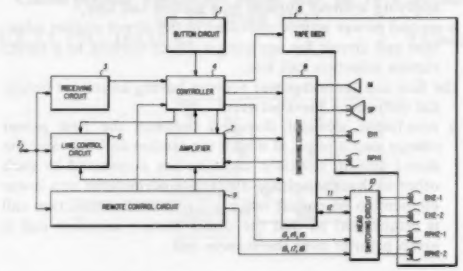
1. In a communications system, an interface circuit for bi-directional transmission of signals between a pair of terminal sets and including transformer means having a pair of winding means, one of said winding means having a center tap, a pair of coupling means coupling said pair of winding means to said pair of terminal sets, said coupling means for said one of said winding means including impedance means coupled between said center tap and a neutral circuit point, and high frequency pulse means coupled to said transformer means to develop high frequency pulses in said winding means, said

high frequency pulse means being arranged to alternately conduct current between opposite ends of said one of said winding means and said neutral circuit point, and comprising a transformer including a primary winding and a secondary winding having a center tap, means connecting said center tap to said neutral circuit point, a pair of unidirectional conduction means connecting opposite ends of said secondary winding to said opposite ends of said one of said winding means, and means for developing a high frequency square wave voltage across said primary winding, each of said coupling means being operative to develop a signal at the corresponding terminal set corresponding to the magnitude of pulses in the corresponding winding means, and each of said coupling means being responsive to a signal applied to the corresponding terminal set to control the magnitude of the pulses in the corresponding winding means and thereby the magnitude of the pulses in the other of said winding means so as to develop a corresponding signal at the other terminal set.

4,011,411
AUTOMATIC TELEPHONE ANSWERING AND RECORDING DEVICE

Yuichi Nishimura, Mitaka, Japan, assignor to Iwatsu Electric Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 431,223, Jan. 7, 1974, abandoned. This application June 13, 1975, Ser. No. 586,584
Claims priority, application Japan, Jan. 12, 1973, 48-5888
Int. Cl.² H04M *1/64*
U.S. Cl. 179—6 E **10 Claims**



1. An automatic telephone answering and recording device adapted to be associated with a telephone set which is connected to a telephone line comprising:

a sound recording tape provided with a plurality of sound tracks,

a plurality of sound recording and reproducing heads corresponding to the plurality of sound tracks of the sound recording tape,

a receiving means for receiving a call signal transmitted from a remote calling party,

head switching means for selecting one of the sound recording and reproducing heads associated with one of the sound tracks of the sound recording tape,

control means responsive to an output of the receiving means for controlling the head switching means to record a message transmitted from the remote calling party on a first sound track of the sound recording tape through the head switching means and through a first sound recording and reproducing head selected by the head switching means,

remote control means responsive to a request signal transmitted from another remote calling party for causing the control means to reproduce the message recorded in the first sound track of the sound recording tape by the first sound recording and reproducing head, and

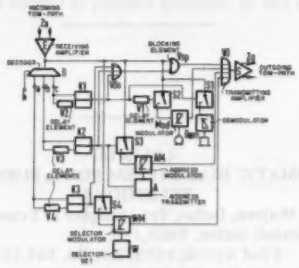
line control means for transmitting the message from the first sound track of the sound recording tape to the another remote calling party,

the remote control means responding to a next request signal from the another remote calling party for causing the head switching means to select the second sound recording and reproducing head associated with the second sound track of the sound recording tape to record a subsequent message on the second sound track.

4,011,412
METHOD OF OPERATING A PCM TIME-DIVISION MULTIPLEX TELECOMMUNICATION NETWORK

Alfred Mattern, Grobenzell, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 14, 1974, Ser. No. 497,293
Claims priority, application Germany, Aug. 14, 1973, 2341115
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976
Int. Cl.² H04Q *11/04*
U.S. Cl. 179—15 BA **4 Claims**



1. A method for operating a PCM time division multiplex telecommunications network utilizing terminal exchanges in the system wherein subscriber stations forming a connection receive the PCM information intended for them responsive to interpretation of their respective addresses which are transmitted from an exchange at the sending end in conjunction with message signals, comprising the steps of:

transmitting addresses of subscriber stations from which message signals are to be sent, from terminal exchange in said network in the time slot allocated for a given connection,

producing message signals from each subscriber station responsive to that subscriber station receiving its address in the time slot allocated to said connection, and

modulating in said subscriber stations an unmodulated byte sent following said addresses in accordance with the message signal to be sent and relaying the modulated result in the desired direction of transmission.

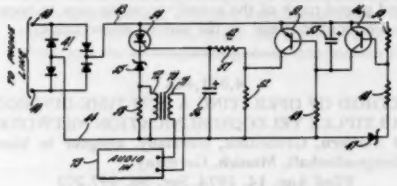
4,011,413
HOLD CIRCUIT FOR TELEPHONE

Robert C. Phillips, Chicago, Ill., assignor to Gimix, Inc., Chicago, Ill.

Filed Jan. 12, 1976, Ser. No. 648,473
Int. Cl.² H04M *1/00*
U.S. Cl. 179—81 R **10 Claims**

1. A hold circuit for use with a telephone, said telephone being connected to a telephone line, said hold circuit comprising in combination, sensing and latching circuit means coupled to said telephone line, said sensing and latching circuit means including means for establishing a high threshold and sensing a voltage on said telephone line exceeding said high threshold indicating an on-hook telephone condition, means for establishing a low threshold and sensing a voltage on said telephone line below said low threshold indicating an off-hook telephone condition; hold signaling means connected to said telephone line and including a hold switch for establishing a voltage on said telephone line intermediate said low and high

thresholds, and latching circuit means in the sensing and latching circuit responsive to said intermediate voltage level



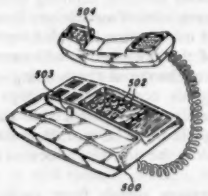
on said telephone line for latching said telephone line into a hold condition.

4,011,414

AUTOMATIC DIAL SYSTEM FOR A SUBSCRIBER TELEPHONE

Walter D. Warren, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 4, 1975, Ser. No. 565,161
Int. Cl.² H04M *1/45, 1/51*
U.S. Cl. 179—90 B **16 Claims**



1. An automatic dial system for a telephone set comprising:

a. an integrated circuit digit processor having at least one set of input terminals and at least one set of output terminals and including:

i. a programmed ROM containing a stored instruction set for controlling the operation of the dial system,

ii. an arithmetic/logic unit for performing arithmetic and logic operations on data according to said stored instruction set, and

iii. a first RAM means for storing data as such data is being processed by said digit processor;

b. a keyboard array having a plurality of keys selectively coupled to at least one of said input terminals for entering coded information into said digit processor in dependence upon the state of said keys;

c. a second RAM means having data input terminal means coupled to at least one of the output terminals of said digit processor, data output terminal means coupled to at least one of the input terminals of said digit processor and address means coupled to a plurality of data output terminals of said digit processor for storing a plurality of digit sequences corresponding to a repertoire of telephone numbers; and

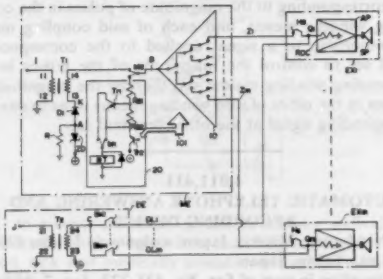
d. signal generator means coupled to at least one output terminal of said digit processor for generating dial dignals corresponding to said stored number sequences.

4,011,415

CALL CIRCUIT FOR KEY TELEPHONE SYSTEM FOR GIVING DIRECT STATION SELECTION CALL PRIORITY OVER STATION CALL

Hikaru Takematsu, Tokyo, Japan, assignor to Iwatsu Electric Co., Ltd., Tokyo, Japan

Filed Mar. 3, 1976, Ser. No. 663,502
Claims priority, application Japan, Mar. 5, 1975, 50-26734
Int. Cl.² H04M *1/00*
U.S. Cl. 179—99 **3 Claims**



1. A call circuit for a key telephone system comprising:

a direct station selection call circuit,

a station call circuit,

a first power source provided in the station call circuit for applying a direct current to a station call line,

a second power source provided in the direct station selection call circuit for applying a direct current to a direct station selection call line;

the first and second power sources having an output potential difference therebetween,

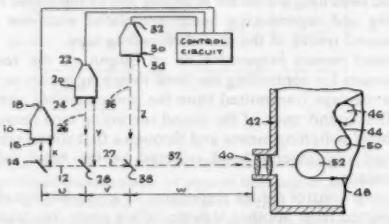
a non-linear element disposed between the first power source and a point at which the station call line and the direct station selection call line are connected to each other so that the voltage difference permits the non-linear element to be cut off when a direct station selection call is established so that the direct station selection call is given priority over the station call.

4,011,416

MULTIPLE COLOR LIGHT FREQUENCIES SWITCHED AUDIO MODULATION

Frank Pontius, Van Nuys, Calif., assignor to Western Geophysical Company of America, Houston, Tex.

Continuation-in-part of Ser. No. 500,968, Aug. 26, 1974, abandoned. This application Nov. 6, 1975, Ser. No. 629,241
Int. Cl.² G11B *7/20*
U.S. Cl. 179—100.3 K **4 Claims**



1. A photographic film exposure apparatus including means for exposing a plurality of light frequencies on a photographic film, comprising:

a. means for emitting a distinct light beam having a differing color light frequency from each of a plurality of charged

particle beams emitted by respective sources, said means including at least one cathode-ray tube source;

b. a plurality of independently variable signals simultaneously received by said apparatus;

c. means for sequentially modulating each one of said plurality of signals onto a first said particle beam and the light beam emitted therefrom;

d. means for synchronously modulating the same said each one of said plurality of signals on a second said particle beam and the light beam emitted therefrom, in the opposite electrical phase relative to the first said light beam modulated by the same said signal;

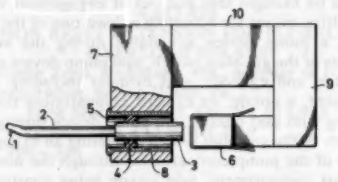
e. means for exposing photographic film including a plurality of distinct light sensitive tracks to said at least two differing colors light frequencies beams for each said signal superposed as a light frequencies beam, whereby each said light sensitive track is exposed to said superposed beam at the instant it has a corresponding selected one of said signals simultaneously received modulated thereon.

4,011,417

DYNAMIC TYPE PICKUP

Tomo Kageyama, Sakai, and Yakichi Yoshinuma, Numazu, both of Japan, assignors to Messrs. Kabushiki Kaisha Mitachi Onkyo Seisakusho, Japan

Filed Mar. 17, 1975, Ser. No. 558,656
Claims priority, application Japan, Mar. 19, 1974, 49-3058
Int. Cl.² H04R *11/12*
U.S. Cl. 179—100.41 K **3 Claims**



1. A record pick-up, comprising a pole piece having spaced magnetic leg portions, a coil wound around one of said leg portions, the other of said leg portions having a bore therethrough extending in a direction away from said coil, a resilient annular member disposed in said bore, a pick-up needle assembly including a needle holder having a needle, adjacent one end of said holder, which is adapted to engage in a record groove and a conductor piece, carried at the opposite end of said holder, having an opposite end face disposed adjacent said coil, said annular member resiliently supporting said conductor piece in said bore, said conductor piece being movable upon movement of the needle in the groove of a record to vary the magnetic field around said coil and introduce an acoustic current flow therein.

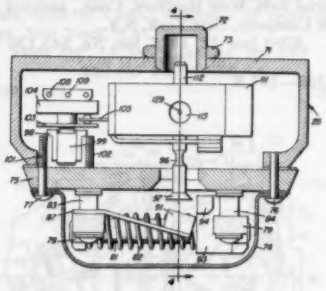
4,011,418

VIBRATION RESPONSIVE SWITCH

Jack H. Watson, Los Angeles, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 78,189, Dec. 23, 1960. This application Oct. 18, 1963, Ser. No. 326,649
Int. Cl.² H01H *35/14*
U.S. Cl. 200—61.45 R **5 Claims**

1. A vibration responsive switch comprising a mass, a pair of support structures located on opposite sides of said mass, a taut wire attached to both of said support structures and to



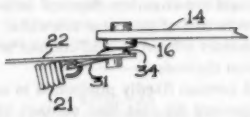
said mass, a switch armature mounted on said mass, and a fixed contact located in physical proximity to said armature.

4,011,419

SWITCH BLADE

Fred N. Anderson, Waukegan, Ill., assignor to Cherry Electrical Products Corporation, Waukegan, Ill.

Filed Jan. 21, 1976, Ser. No. 650,890
Int. Cl.² H01H *13/28*
U.S. Cl. 200—67 B **8 Claims**



1. A switch blade for a snap-action switch having a pivotal mounting for one end of the blade and an overcentering mechanism including a coil spring for yieldably holding the blade on the mounting and for pivoting the blade between stationary contacts, wherein the improvement comprises

a. a substantially flat rectangularly shaped switch blade body,

b. a first slot cut inwardly of one end of said body dividing said end of said body into a pair of pivotal legs,

c. a tongue formed in said body by a pair of slots extending in opposite diverging directions from the inner end of said first slot, with said diverging slots terminating adjacent the opposite longitudinal edges of said body and short of the other end thereof,

d. a contact carried on the line of junction between said tongue and said other end of said body and in normal engagement with one of the stationary contacts,

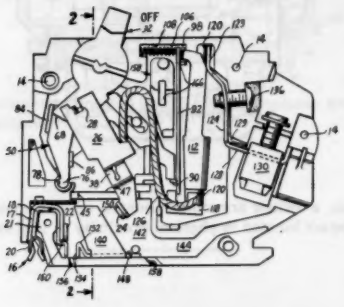
e. said tongue providing means for connection to one end of the coil spring so as to pivotally connect said legs onto the pivotal mounting, and

f. means formed by said pair of slots providing a connection between said legs and said other end of said body about which said tongue is flexed out of its normal plane by the coil spring, with said contact moving with said tongue in a shearing and rocking action off the stationary contact it normally engages.

4,011,420
MOLDED CASE CIRCUIT BREAKER WITH IMPROVED INTERRUPTING CAPACITY

Eldon Bertel Heft, West Hartford, Conn., assignor to General Electric Company, New York, N.Y.

Filed Jan. 22, 1975, Ser. No. 543,134
Int. Cl.² H01H 9/34
U.S. Cl. 200—147 R 3 Claims



1. An electric circuit breaker comprising, in combination:

A. a molded insulative case having top and bottom walls and opposed end and sidewalls;

B. an arc chamber formed in said case adjacent said bottom wall;

C. an operating mechanism including

1. an operating handle pivotally mounted by said case and having an externally accessible handle portion extending through an opening in said case top wall, and

2. an elongated contact arm within said case pivotally connected adjacent its upper end to said handle and extending downwardly to a termination located within said arc chamber, an elongated portion of said arm above said arc chamber disposed in intimately spaced relation to one of said case sidewalls;

D. a first contact affixed to said contact arm adjacent said termination thereof;

E. a second contact fixedly positioned in said arc chamber for engagement by said first contact when said arm is pivoted to a closed circuit position;

F. a magnetic conductive arc chute disposed in said arc chamber, said arc chute having

1. a base lying adjacent said case bottom wall,

2. sideplates extending upwardly along each case sidewall to substantially the full height of said arc chamber with upper terminations located well-above the level of said first contact while in its position of engagement with said second contact, said sideplates shielding the terminal current carrying portion of said contact arm from external magnetic fields penetrating the case of sidewalls, and

3. a raised, conductive frontal portion extending upwardly from said base toward said second contact and into proximity with the path of movement of said first contact away from said second contact;

G. a first arc runner extending downwardly from said chute raised frontal position to a termination adjacent said case bottom wall;

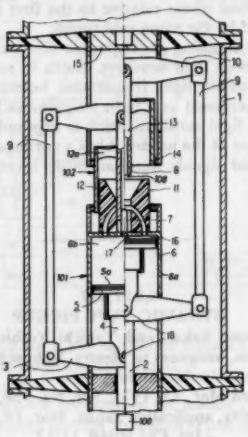
H. a second arc runner electrically connected to said second contact and extending downwardly therefrom in spaced relation to said first arc runner to a termination adjacent said case bottom wall; and

I. means forming a vent opening in said case bottom wall at a location intermediate said first and second arc runner terminations.

4,011,421
GAS-BLAST SWITCH

Richard Thaler, Unterentfelden, Switzerland, assignor to Sprecher & Schuh AG, Aarau, Switzerland

Filed Aug. 11, 1975, Ser. No. 603,864
Claims priority, application Switzerland, Aug. 14, 1974, 11121/74
Int. Cl.² H01H 33/88
U.S. Cl. 200—148 A 7 Claims



1. A gas-blast switch comprising two contact elements which can be brought into and out of engagement with one another, drive means for actuating at least one of the contact elements, a pump device actuatable during the switching movements of the gas-blast switch, said pump device comprising a piston and cylinder, said cylinder including a pump compartment, a nozzle, an exhaust compartment flow communicating with said nozzle, said pump device during cut-off movements of the gas-blast switch delivering an extinguishing agent out of the pump compartment through the nozzle into the exhaust compartment, said nozzle being constructed to take-up a switching arc which is formed between the separating contact elements, said piston comprising a number of piston portions which are guided in a gastight manner for relative movement within one another and dividing a piston surface of the piston which confronts the pump compartment, one of the piston portions defining a first piston portion which is positively connected with the drive means, a respective releasable coupling mechanism arranged between the first piston portion positively connected with the drive means and a second piston portion and between such second piston portion and the pump cylinder, said coupling mechanisms upon cut-off of the gas-blast switch and as a function of the pressure difference between the pump compartment and the exhaust compartment selectively positively connecting the second piston portion either with the first piston portion below a pre-selected excess pressure limit prevailing in the pump compartment or the second piston portion with the pump cylinder when there prevail pressure values which are above the pre-selected limit.

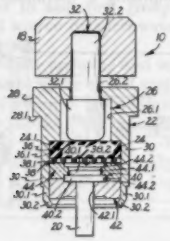
4,011,422
PUSH-BUTTON SWITCH

Carlton E. Sanford, East Providence, R.I., and Laurence P. Kleven, South Attleboro, Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 3, 1975, Ser. No. 554,385
Int. Cl.² H01H 3/12
U.S. Cl. 200—159 B 4 Claims

1. A push-button switch comprising an electrically conduc-

tive body having a chamber and a passage communicating with the chamber, fixed contact means supported in the body chamber, a flexible diaphragm sealing said chamber from said passage, an operating member slidable in said passage to depress the diaphragm, and a flat spiral spring disposed within the chamber between said fixed contact means and diaphragm with the perimeter of the spring in resilient electrical engagement with the body and with a central portion of the spring disposed in selected spaced relation to the fixed contact means permitting sliding movement of the operating member to depress the central portion of the spring through the sealing flexible diaphragm into electrical engagement with the fixed contact means to close an electrical circuit between the body and the fixed contact means.



4,011,423

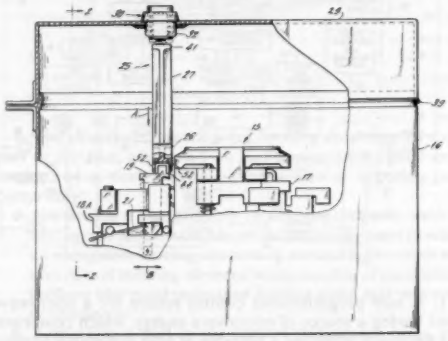
COMMON RESET EXTENSION FOR PLURALITY OF OVERLOAD RELAYS

Robert Glenn Zepp, Finksburg, Md., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Sept. 12, 1975, Ser. No. 612,943

Int. Cl.² H01H *3/20*

U.S. Cl. 200—330 **7 Claims**



1. Electrical switching apparatus including housing means having an openable front cover, a plurality of switches mounted within said enclosure with each having a rearwardly depressible reset handle, a control mounted on said cover so as to be movable therewith and operable from outside of said housing means said switches being disposed with their handles remote from said cover and said control, a common reset extension means operatively mounted to said switches extending forward thereof for operative engagement by said control to transmit rearward movement of the latter to said handles for resetting said switches, with said cover open, said control being remote from said extension means and the latter remaining mounted to said switches.

4,011,424

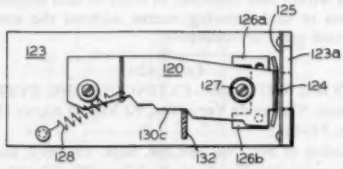
POSITION INDICATOR FOR DRAWOUT APPARATUS

Eric Axel Ericson, Plainville, and Frederick Daniel Kaufhold, Forestville, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed Apr. 14, 1975, Ser. No. 567,619

Int. Cl.² H01H *9/00*

U.S. Cl. 200—308 **10 Claims**



1. In a drawout assembly including a carriage mounting an electrical device and, in turn, supported on rails for accommodating racking movement of the device into and out of an electrical enclosure, indicator apparatus comprising, in combination:

A. an elongated arm movably mounted to one of the carriage and enclosure;

B. a step cam elongated generally in the directions of movement of the device carriage relative to the enclosure and consisting of a series of differentially elevated, essentially straight cam segments interconnected by relatively sharply angled cam segments;

C. an actuator, said actuator mounted by one of said carriage and enclosure and said step cam mounted by the other of said carriage and enclosure for relative movement proportional to the movement of the carriage relative to the enclosure, said arm mechanically interconnected with one of said actuator and step cam, and said actuator engaging said angled and straight cam segments to abruptly variously elevate said arm in correlation with the position of the carriage relative to the enclosure; and

D. means carried by said arm to indicate, in accordance with the arm elevation, the various positions of the carriage as it is moved on the rails relative to the enclosure.

4,011,425

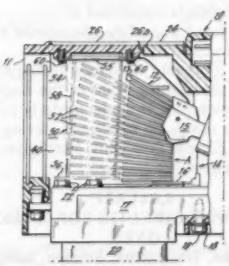
ARC CHUTE EXTENSION FOR INCREASED INTERRUPTION RATING

Carl E. Gryctko, Haddon Heights, N.J., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Jan. 3, 1975, Ser. No. 538,342

Int. Cl.² H01H *9/36*

U.S. Cl. 200—144 R **9 Claims**



1. A circuit breaker including an insulating case having removable cover means; a terminal bus; a pole unit within said case including separable cooperating movable and stationary contacts, said stationary contact being mounted to said bus at one end and in front thereof; a main spaced-plate arc chute having an entrance end operatively positioned at said one end

of said bus to receive electric current arcs drawn between said contacts during separation thereof; a chamber within said case positioned forward of said bus at the other end thereof; securing means for maintaining said circuit breaker in electrical connection with an external circuit, said securing means being accessible for operation within said chamber; and a spaced-plate arc chute extension disposed within said chamber to receive portions of electric current arcs extending through said main arc chute, said arc chute extension being removably mounted within said chamber in front of said securing means for access to said securing means without the necessity of moving said main arc chute.

4,011,426

DEVICE WITH ARC-EXTINGUISHING SYSTEM

Emil Lange, 97, rue de Versailles, 92 Ville D'Avray (Hauts-de-Seine), France

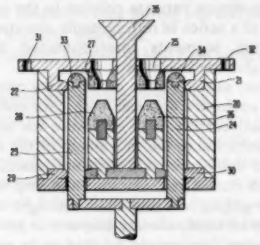
Continuation of Ser. No. 289,256, Sept. 15, 1972, abandoned, which is a continuation-in-part of Ser. No. 67,666, Sept. 26, 1967.

This application July 7, 1975, Ser. No. 593,313

Claims priority, application Germany, Sept. 26, 1966, 54644

Int. Cl.² H01H *33/02, 9/30*

U.S. Cl. 200—144 C **21 Claims**



1. A device for extinguishing electric arcs comprising:
a first electrode, and
a second electrode
wherein
an electric arc burns between said first and second electrodes,
said first electrode is composed of
a metallic substance providing said first electrode with electrical conductivity, and
a non-metallic substance having the property of giving off a volatile, arc extinguishing gas due to the heat of the electric arc, and
said second electrode is composed of
a metallic substance providing said second electrode with electrical conductivity, and
a non-metallic inorganic substance having a melting point higher than the melting point of the non-metallic substance of which said first electrode is composed, said non-metallic inorganic substance having the property of reducing current flow while itself giving off no volatile arc-extinguishing gases.

4,011,427

ELECTRIC SUPPLY CIRCUITS FOR A MICROWAVE OVEN

Per Olov G. Risman, Huskvarna, Sweden, assignor to Husqvarna Vapenfabriks AB, Huskvarna, Sweden

Continuation of Ser. No. 401,558, Sept. 27, 1973, abandoned.

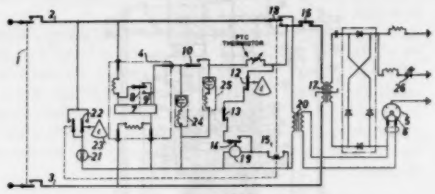
This application Feb. 13, 1975, Ser. No. 549,739

Claims priority, application Sweden, Sept. 27, 1972, 12448/72

Int. Cl.² H05B *9/06*

U.S. Cl. 219—10.55 B **1 Claim**

1. An electric supply circuit for a microwave oven provided with a magnetron tube in which an anode circuit is supplied with high voltage, said circuit comprising in combination; a main power supply; a leakage reactance transformer having a primary winding and a secondary winding; said secondary winding supplying said anode circuit; two parallel circuits connecting said primary winding of said transformer to said main power supply, a first one of said two circuits including a switch and a protective resistor serially connected, said protective resistor comprising a thermistor having a positive



temperature constant; a second one of said two circuits including a relay contact; and a relay coil connected in series to said protective resistor and forming an additional circuit which is connected in parallel to said primary winding of said transformer, said relay coil controlling said relay contact, said first one of said circuits being energized upon actuation of said switch supplying said relay coil and said primary winding through said protective resistor, said second one of said circuits being energized upon actuation of said relay coil to close said relay contact.

4,011,428

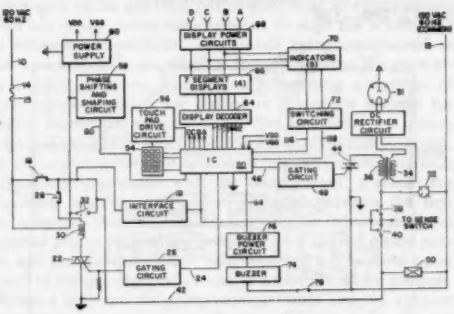
MICROWAVE OVEN TIMER AND CONTROL CIRCUIT

Robert D. Fosnough, and David F. Bennett, both of Logansport, Ind., assignors to Essex International, Inc., Fort Wayne, Ind.

Filed Mar. 24, 1975, Ser. No. 561,277

Int. Cl.² H05B *9/06*

U.S. Cl. 219—10.55 B **4 Claims**



1. A user programmable control system for a microwave oven having a source of microwave energy, which comprises:
a keyboard including a plurality of user actuatable number switches and a plurality of user actuatable function switches;
control logic circuit means for detecting the actuation of ones of said number and function switches;
memory means for storing first and second groups information therein;
means responsive to the detection of the actuation of ones of said number switches for loading information into said first group which is representative of the duration of a first time interval;
means responsive to the detection of the actuation of a certain one of said function switches for allowing information to be entered into said second group of information;

means responsive to the detection of the actuation of ones of said number switches subsequent to the detection of the actuation of said certain one of said function switch for loading information into said second group which is representative of the duration of a second time interval;

means for periodically updating said first group of information so that the first group of information is representative, at any given time, of the time remaining in said first time interval;

means responsive to said first group of information for energizing said source of microwave energy during said first time inverval;

means for periodically updating said second group of information subsequent to the end of said first time interval so that the second group of information is representative at any given time, of the time remaining in a second time interval; and

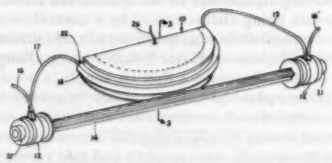
means responsive to said second group of information for energizing said source of microwave energy during said second time interval;

4,011,429

HOT STRETCH-WRAP FORMING WITH RESISTANCE HEATING

Carl M. Morris, Manhattan Beach; William E. Manchester, Lomita; John L. Hill, Redondo Beach; Robert A. Bridwell, Buena Park, and Douglas B. Hugill, Hermosa Beach, all of Calif., assignors to Northrop Corporation, Los Angeles, Calif.

Filed Oct. 20, 1975, Ser. No. 624,117
Int. Cl.² B21J *13/08*; H05B *3/26*
U.S. Cl. 219—153 **6 Claims**



1. The process of stretch-wrap forming an elongated metal part or the like, particularly a part having an irregular cross section, on a stretch press having a pair of opposing jaws, comprising:

a. positioning a die assembly on said stretch press, said die having a heat-resistant electrical insulating insert in which an elongated forming element is mounted, the cross section of said forming element being capable of maintaining uniform electrical resistance heating when said process is in operation.

b. positioning a part in the jaws of said stretch press, said jaw as being electrically isolated from said stretch press,

c. passing a heating current in parallel through said forming element and said part,

d. bringing said part in contact with said element when said element is uniformly heated to the forming temperature of said part,

e. stretch-wrap forming said part around said element of said die,

f. stopping said current and holding the formed part in mating relationship with said element until said part has dropped to a desired temperature below said forming temperature, and

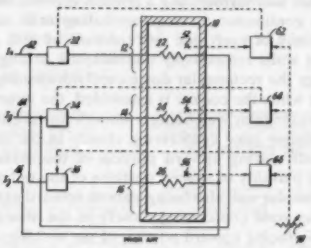
g. removing said formed part from said jaws.

4,011,430

MULTIZONE ELECTRICAL FURNACE METHODS AND APPARATUS

Donald Eli Witkin, and Andrew Stephenson Dalgleish Crum, both of Warren, Pa., assignors to National Forge Company, Irvine, Pa.

Filed May 6, 1975, Ser. No. 574,961
Int. Cl.² H05B *1/02*
U.S. Cl. 219—486 **8 Claims**



1. In an electrical furnace including a plurality of thermal zones, said furnace being supplied with polyphase electrical power, the improvement comprising:

a plurality of heater circuits associated with each thermal zone, each of said heater circuits including a heating element and a thyristor device for controlling the amount of power supplied to said heating element;

means for connecting the heater circuits associated with each thermal zone in parallel in circuit relation with a respective one of the phases of the polyphase power; and

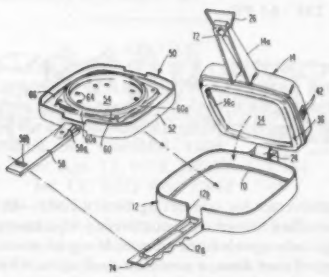
means for controlling the thyristor devices in the heater circuits associated with each thermal zone so that only one of said thyristor devices is operating to produce a substantial phase shift in the power supplied to the associated heating element at any time.

4,011,431

ELECTRIC COOKING APPLIANCE WITH REVERSIBLE GRILL

Monte L. Levin, 19 Sutton Place, New York, N.Y. 10022

Filed Apr. 5, 1976, Ser. No. 673,629
Int. Cl.² H05B *1/00*; A47J *37/00*; B29C *3/00*
U.S. Cl. 219—524 **7 Claims**



1. A versatile efficient electric fast cooker for hamburgers, sandwiches and the like comprising

a. a rectangular cover having on the bottom thereof a flat downwardly-facing cooking surface surrounded by a substantially rectangular downwardly porjecting heat-conducting continuous rib containing an electric heating element;

b. a drip-receiving box-like rectangular base pan having an

open top, sidewalls, and a floor, said base pan adapted to mate with and support the cover;

c. hinge means connecting the cover and base pan;

d. a perforated, substantially flat two-sided invertible rectangular metal grill adapted to be received by the base pan, one of the sides constituting the hamburger-cooking side of the grill and presenting an inwardly facing, relatively circular wall surrounding a portion thereof, and the other side constituting the sandwich-grilling side of the grill and presenting an inwardly facing substantially rectangular wall surrounding a portion thereof, the grill having a continuous rectangular mating zone adjacent the periphery of each side and outward of said square and round walls respectively and adapted to align with and engage the rectangular downwardly projecting rib on the cover when the cooker is assembled, the outer surface of the rectangular wall being a smooth upward extension of the mating zone conforming closely to the shape of the inwardly facing upward portion of the rectangular rib, and a plurality of spaced portions of the outer surface of the circular wall also being smooth upward extensions the mating zone conforming closely to the shape of the inwardly facing upward portion of the rectangular rib; and

e. support means in the base pan for engaging at least a portion of the underside of the grill to support the grill in the base pan, the support means and the grill being so shaped that irrespective of which surface is upward, the support means holds the grill up with the upward mating zone engaging the rib;

whereby when the cooker is assembled with the sandwich grilling side upward, the grill is adapted to support for cooking a square sandwich or the like, and when the cooker is assembled with the hamburger-cooking side upward, the grill is adapted to support for cooking a round hamburger or the like, in the respective instances the upwardly facing mating zone as well as the outer surface of the rectangular wall and at least some of said portions of the circular wall being in engagement with or very proximate the rib to provide effective heat exchange from the heating-element-containing rib to the grill.

4,011,432

CONVERTER

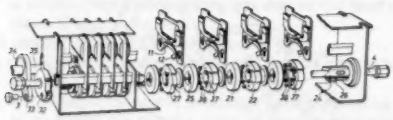
Kenneth Oscar Emanuel Skogward, Huskvarna, Sweden, assignor to Husqvarna AB, Husqvarna, Sweden

Filed June 10, 1975, Ser. No. 585,563

Claims priority, application Sweden, June 13, 1974, 7407801

Int. Cl.² G06K *1/00*

U.S. Cl. 235—61 PE **6 Claims**



1. A converter for converting binary codes into mechanically controlled movements, comprising adjustment means for receiving code signals from an outside signal source, a plurality of sets of cam discs, a common shaft upon which said sets are mounted and axially displaceable thereon, each of said sets comprising pairs of cam discs having axial cams facing one another, wherein said adjusting means further comprises control elements equipped with locking devices cooperating with locking teeth on the periphery of one cam disc in each said pairs of cam discs, said control elements operable between a locking position and a free position in response to said signals from the signal source, said converter further comprising a converter drive system comprised of an axial arrangement of the cam disc sets on said common shaft in cooperation with an indexing mechanism, driven by a rotating means, for rotatably driving the other cam disc in said pairs of cam discs in an oscillating movement said converter for producing an axial stroke in the respective cam disc sets in which said locking devices assume the locking position, which axial strokes are added in the row of cam disc sets into an output movement relative to a zero position.

4,011,433

VALUE DISPENSING SYSTEM

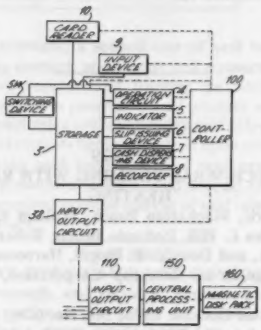
Kazuma Tateisi, Kyoto; Sizuka Horii, Nagaokakyo, and Yasuo Uchida, Takatsuki, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Jan. 27, 1975, Ser. No. 544,215

Claims priority, application Japan, Feb. 1, 1974, 49-13793

Int. Cl.² G06K *7/01*

U.S. Cl. 235—61.7 B **15 Claims**

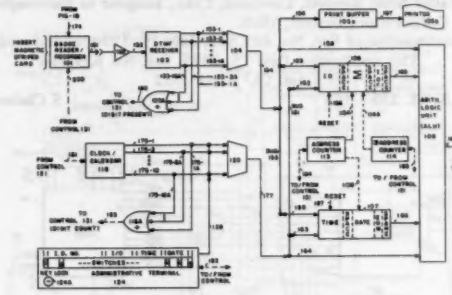


1. A system for automatically dispensing value, wherein a card for actuating said system is previously issued to each customer having an account in the system, the current status of said account being characterized by a current on-line balance and a current off-line balance, one of said current on-line balance and said current off-line balance being changed each time said system dispenses value to supply a new current off-line balance and a new current on-line balance representative of the status of said account after said value is dispensed, each said card having recorded thereon necessary data including at least the identification number and said current off-line balance of said account, said system comprising: means for reading said data recorded on said card; value setting means for setting an amount of value to be dispensed; means for storing said current on-lien balance of the account of each said customer; first comparison means for determining whether said amount is to be dispensed by comparing said amount with said current on-line balance to which access is made by said identification number of said card read by said reading means; second comparison means for determining whether said amount is to be dispensed by comparing said amount with said current off-line balance, said second comparison means being operable in response to a control signal; first control means responsive to said first comparison means for supplying said control signal to render said second comparison means operative whenever said first comparison means determines said amount is not to be dispensed on the basis of said comparison of said amount with said current on-line balance; and dispensing means for dispensing value equivalent to said amount of value established by said value setting means, said dispensing means responsive to said first comparison means to dispense said value when said first comparison mans determines said amount does not exceed said current on-line balance, said dispensing means responsive to said second comparison means to dispense said value when said second comparison means determines said amount does not exceed said current off-line balance.

4,011,434
STAND-ALONE CUMULATIVE ELAPSED-TIME CALCULATING SYSTEM

Norman N. Hockler, Galion, Ohio, assignor to North Electric Company, Galion, Ohio

Filed Aug. 25, 1975, Ser. No. 607,495
Int. Cl.² G06K *1/00, 7/10*
U.S. Cl. 235—61.9 R 18 Claims



1. In a time recordation system for recording data related to successive uses of said system,

a portable recording medium having data recording areas permitting recording of data related to the last use of the system,

switchable means operative in a first mode to extract data from said recording medium,

logic means responsive to first data extracted from said recording medium by said switchable means for calculating the time difference between first and second uses of said system to thereby generate elapsed time data representing a measure of the elapsed time between said first and second uses, and to use said elapsed time data and second data extracted from said recording medium to generate modified data representing current cumulative elapsed time,

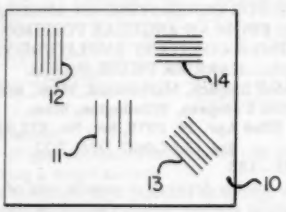
said switchable means being operative in a second mode to record said modified data upon said recording medium and

visual display means for displaying said cumulative elapsed data at the time of each use of the system.

4,011,435
OPTICAL INDICIA MARKING AND DETECTION SYSTEM

Robert A. Phelps, Kettering, and William R. Horst, Dayton, both of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Feb. 1, 1974, Ser. No. 438,886
Int. Cl.² G06K *7/14, 9/04;* G11C *11/44*
U.S. Cl. 235—61.11 E 4 Claims



1. An optical identification system comprising:

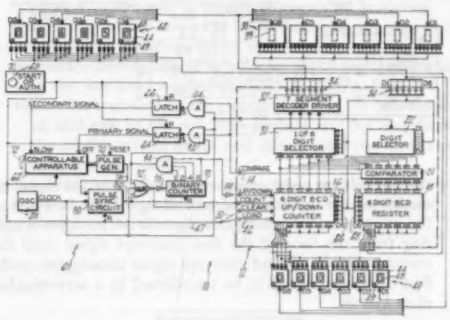
optical indicia members each including a plurality of singularly distinguishable diffraction grating elements overlaying a retroreflective element in a multiple layer structure with each of said diffraction grating elements having a selected line spacing and angular orientation, which spacing and orientation corresponds to a selected code;

indicia classifying apparatus including a source of coherent light capable of illuminating a viewed indicia member, and light sensing means responsive to a plurality of light images produced by said diffraction grating elements of said viewed indicia member for converting said images into usable code signals.

4,011,436
MULTIPLE LEVEL PREDETERMINING SYSTEM

Robert J. Schiller, Simsbury, Conn., assignor to Veeder Industries, Inc., Hartford, Conn.

Filed Feb. 13, 1976, Ser. No. 657,854
Int. Cl.² G06M *3/02;* H03K *21/36*
U.S. Cl. 235—92 PE 12 Claims



1. A multiple level predetermining system having a bidirectional predetermining counter operable for being indexed for accumulating a primary count and for generating a primary predetermining control signal when the primary accumulated count reaches a first predetermined accumulated count, and a predetermining control system for automatically generating at least one additional secondary predetermining control signal when the primary count reaches an accumulated count which differs from said first count by a predetermined count differential, the predetermining control system comprising indexing means for indexing the bidirectional counter in a first direction and then the opposite direction through a secondary counting cycle having a plurality of N-1 counts in each direction at least equal to said count differential, and predetermining signal control means for generating a secondary predetermining control signal if the accumulated count equals said first count when the counter is indexed said count differential during a secondary counting cycle.

4,011,437
METHOD AND APPARATUS FOR COMPENSATING FOR UNPROGRAMMED CHANGES IN RELATIVE POSITION BETWEEN A MACHINE AND WORKPIECE

Richard Edward Hohn, Cincinnati, Ohio, assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio

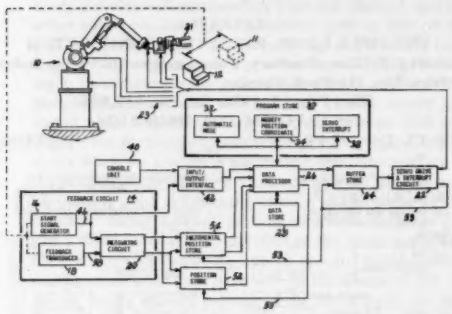
Filed Sept. 12, 1975, Ser. No. 612,764
Int. Cl.² B25J *9/00;* G06F *15/46*
U.S. Cl. 235—151.11 32 Claims

1. An apparatus for modifying command signals representing predetermined positions of a machine element relative to a workpiece to compensate for measurable unprogrammed changes in the relative position between said machine element and workpiece, said machine element being controlled by a servomechanism circuit generating interrupt signals defining fixed time intervals and causing command signals to be transferred to the servomechanism circuit, the apparatus comprising:

a. means for producing feedback signals representing the sign and magnitude of an unprogrammed change in the relative position between the machine element and the workpiece;

b. means responsive to command signals and the feedback signals for initializing the command signal as a function of the unprogrammed change in the relative position occurring up to the time of a first interrupt signal defined by the most recent occurrence of an interrupt; and

c. means responsive to the feedback signals and the inter-



rupt signals for producing a modified command signal by modifying the initialized command signal as a function of the unprogrammed change in the relative position occurring from the time of the first interrupt signal until the occurrence of a second interrupt signal causing the modified command signal to be transferred to a servomechanism circuit.

4,011,438

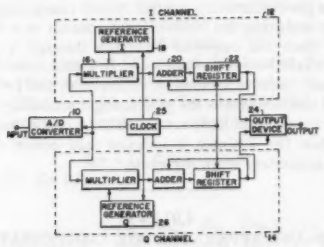
SIMPLIFIED DIGITAL MOVING TARGET INDICATOR FILTER

Maurice Bernard Aufderheide, and Guy Vernon Morris, both of Scottsdale, Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed Dec. 17, 1975, Ser. No. 641,392

Int. Cl.² G01S 9/42; G06F 15/34

U.S. Cl. 235—152 **9 Claims**



1. A digital filter for generating a frequency domain output signal from an incoming signal arriving in successive receiving cycles when the incoming signal has any frequency component lying within the pass-band of said digital filter, comprising:

a. means for generating a timing signal;

b. analog-to-digital converter means responsive to said timing signal for converting the incoming signal into digital input pulses, wherein each digital input pulse corresponds to a range gate interval;

c. reference generator means responsive to the timing signal for providing a train of digital reference pulses for each of the successive receiving cycles, wherein a predetermined number of the successive receiving cycles form a frame and wherein the amplitude of each train of digital reference pulses is determined by a correlation function;

d. means for multiplying each digital reference pulse with each digital input pulse to generate a train of discrete digital outputs for each receiving cycle; and

e. means responsive to the timing signal for accumulating the discrete digital outputs from said multiplying means and generating the frequency domain output signal for each frame of digital reference pulses.

4,011,439

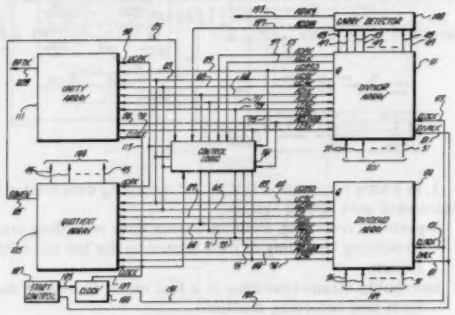
MODULAR APPARATUS FOR ACCELERATED GENERATION OF A QUOTIENT OF TWO BINARY NUMBERS

Walter Scott Bennett, Loveland, Colo., assignor to Burroughs Corporation, Detroit, Mich.

Continuation of Ser. No. 489,885, July 19, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 639,514

Int. Cl.² G06F 7/52

U.S. Cl. 235—164 **5 Claims**



1. A divider for dividing a dividend bit pattern by a divisor bit pattern to form a quotient bit pattern, comprising:

first means for receiving a divisor bit pattern;

said first means including means for manipulating a received divisor bit

pattern so as to produce control signals representative of the multiplication of the received divisor bit pattern by its reciprocal;

second means for receiving a dividend bit pattern;

means for applying said control signals produced by said first means to said second means;

said second means including means responsive to said control signals for manipulating a received dividend bit pattern in accordance with said control signals so as to generate output signals representative of said quotient bit pattern; and

third means for detecting if said quotient has been generated to a bit precision equal to the bit length of a period of the reciprocal of said divisor, and, in response to such detection, doubling the precision of the generated quotient.

4,011,440

SYSTEM FOR GENERATING AN ANGULAR RATE SIGNAL FROM AN ANGULAR POSITION SIGNAL UTILIZING A CONSTANT AMPLITUDE-VARIABLE CARRIER PHASE SIGNAL

Helmar Rudolf Steglich, Marblehead, Mass., assignor to General Electric Company, Wilmington, Mass.

Filed Apr. 29, 1975, Ser. No. 572,933

Int. Cl.² G06G 7/18, 7/22

U.S. Cl. 235—183 **8 Claims**

1. In a circuit for deriving an angular rate of change signal from an angular position signal, the combination comprising;

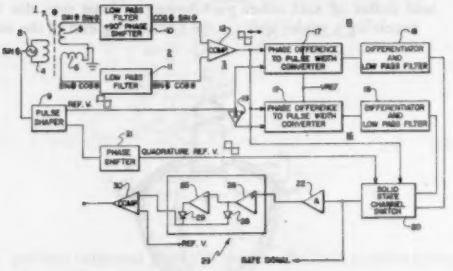
a. angular position signal generating means for providing two fixed phase carrier signals which are respectively amplitude modulated proportionately to the sine and cosine of the angle,

b. means for converting the two fixed phase carrier signals which are amplitude modulated proportionately to the sine and cosine of the angle to a constant amplitude carrier signal, the phase of said constant amplitude carrier signal varying with respect to the phase of said two

amplitude modulated fixed phase carrier signals with variations of angular position so that the phase of said constant amplitude carrier signal is proportional to said angular position,

c. signal conversion means for converting the constant amplitude signal the phase of which varies with angular position to a unidirectional signal proportional to the angular rate of change including:

1. first means to convert the constant amplitude signal the



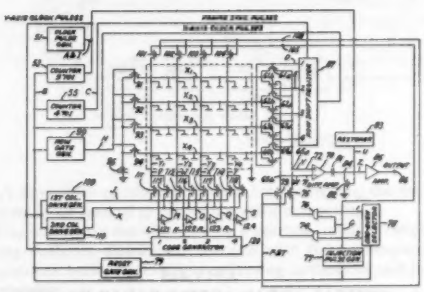
phase of which varies with angular position to a unidirectional signal which is proportional to the carrier phase and thus to the angular position,

2. second means to convert said unidirectional voltage signal proportional to angular position to a unidirectional signal proportional to angular rate of change including means to differentiate the unidirectional signal proportional to angular position to derive a unidirectional signal proportional to angular rate of change.

4,011,441
SOLID STATE IMAGING APPARATUS

Gerald J. Michon, Waterford, and Hubert K. Burke, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,560
Int. Cl.² G06G 7/12; H04N 3/14
U.S. Cl. 235—193 **5 Claims**



1. In combination,

a substrate of semiconductor material of one type conductivity having a major surface,

first means forming a first plurality of charge storage sites for opposite type carriers adjacent said major surface of said substrate,

second means forming a second plurality of charge storage sites for opposite type carriers adjacent said major surface of said substrate, each coupled to a respective charge storage site of said first plurality to form a plurality of coupled pairs of charge storage sites,

said coupled pairs of charge storage sites being arranged in an array of rows and columns,

a plurality of row conductor lines and a plurality of column conductor lines,

said first means including a first plurality of electrodes each insulatingly overlying a respective one of said storage sites of said first plurality, each of the electrodes of said first plurality in a respective row of sites being connected to a respective row line,

said second means including a second plurality of electrodes, each insulatingly overlying a respective one said storage sites of said second plurality, each of the electrodes of said second plurality in a respective column of sites being connected to a respective column line,

means for exposing said substrate to radiation to generate and store charge in said storage sites of said substrate,

means for obtaining signals proportional to algebraic sums of charge in a row of charge storage sites including:

means for storing charge to be sensed with one sign in the colum line coupled sites of said row,

means for storing charge to be sensed with the opposite sign in the row line coupled sites of said row,

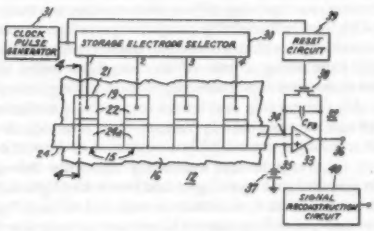
means for transferring the charge stored in the column sites of said row to the row sites thereof and for transferring the charge stored in the row sites of said row to the column sites thereof,

means for sensing the signal induced on said first plurality of electrodes of said row in response to the transfer of charge in the storage sites of said row.

4,011,442
APPARATUS FOR SENSING OPTICAL SIGNALS

William E. Engeler, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,539
Int. Cl.² G06G 7/12; H04N 3/14
U.S. Cl. 235—193 **12 Claims**



1. Imaging apparatus comprising

a substrate of semiconductor material of one type conductivity having a major surface,

means forming a first plurality of charge storage sites for opposite type carriers adjacent said major surface of said substrate,

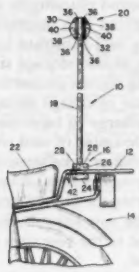
means for exposing said substrate to a spatial pattern of radiation to produce a pattern of opposite type carriers of variable quantity in said plurality of storage sites, the quantity of opposite type carriers in each storage site being proportional to a respective sample of said spatial pattern of radiation,

output means for deriving an output comprising signals proportional to the algebraic sums of selected combinations of the charge in said first plurality of charge storage sites, said signals being formed by repeatedly sensing the charge in said first plurality of charge storage sites in different combinations.

4,011,443
MOTORCYCLE INDICATING SAFETY LIGHT ASSEMBLY

Merle F. Smith, 443 W. Main St., Dallastown, Pa. 17313, and Harold H. Wagman, 370 Lakeview Drive, York, Pa. 17402

Continuation-in-part of Ser. No. 506,397, Sept. 16, 1974, abandoned. This application Apr. 7, 1975, Ser. No. 565,775
Int. Cl.² B62J *5/00*
U.S. Cl. 240—7.55 **7 Claims**



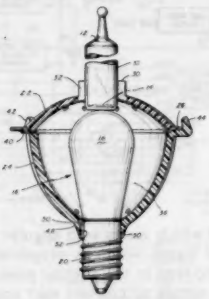
1. An indicating safety light assembly comprising in combination, a clamp-type subassembly attaching means comprised of a pair of complementary members each having clamping surfaces opposing each other and provided in said surface centrally positioned V-shaped recesses wherein one of said recesses is larger than the other in cross-section thereby adapting said members to effectively receive and be clampably affixed to and firmly grip at least one of a plurality of different sized generally horizontal rod-like structural frame members of a motorcycle vehicle rearwardly of the front wheel base and handle bar said attaching means having at least one threaded socket radially provided in one of said complementary members thereof, a tubular rod threaded at one end into said socket and extending upwardly therefrom, said tubular rod being supported by said attaching means in vertically aligned position relative to said frame member, a geometrically shaped elongated block-like light subassembly threadably connected co-axially to the upper end of said tubular rod and having an opening to receive conductor means, said block-like light subassembly comprising a support base having opposite sides provided with socket means respectively receiving and supporting a pair of electric light bulbs, different colored elongated cup-shaped light-transmitting lenses, means removably connecting said lenses respectively to the opposite sides of said support base in back-to-back relation, an electric circuit conductor connectable at one end to a source of current on said vehicle and extending upwardly through said tubular rod and said opening in said block-like light subassembly for connection to contacts connected to said light bulb sockets and providing electrical current connection for said bulbs, and a circuit control means in said electric circuit.

4,011,444
LAMP ASSEMBLY

George D. Levy, Wellesley Hills, Mass., assignor to ACLA, Inc., Boston, Mass.

Filed Oct. 31, 1975, Ser. No. 627,545
Int. Cl.² A47G *33/16*; **F21P** *1/02*
U.S. Cl. 240—10 A **1 Claim**

1. A lamp assembly comprising, in combination:
a transparent tube in the form of a candle completely enclosed and for holding a quantity of liquid filling less than the total space in the tube and which generates bubbles in the tube when heat is applied at one end of the tube,
an incandescent bulb having an illuminating end and a threaded connecting end,
a housing for holding both the tube and bulb including two separable housing parts defining a chamber joining along a circular locus and having a passage in one part defined by a slotted collar for accommodating the tube with the tube extending partially into the chamber and a passage in the other part defined by a collar integral with the other part and in line with the passage in the one part when the parts are assembled for accommodating the bulb with the illuminating end disposed in the chamber in juxtaposition to the one end of the tube and the connecting end extending outwardly from the housing for connection to an electrical socket,
said collar of said other part having at least one slot for receiving a solder spot on the connecting end of the bulb



to prevent rotation of the bulb relative to the other housing part,
means associated with the housing for separably holding the two parts together in an unpermanent manner so that the parts can be separated for the purpose of replacing the bulb comprising three equally spaced ears extending from an annular flange of the other housing and a like annular flange of said one housing fitting within the ears to hold the parts together, said annular flanges having flat mutual contacting surfaces,
and means for separating the housing parts including a tab integral with and extending from the annular flange of the one part and disposed between a pair of the three ears.

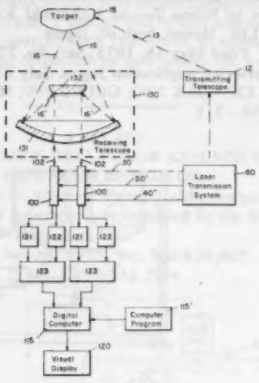
4,011,445
OPTICAL ARRAY ACTIVE RADAR IMAGING TECHNIQUE

Thomas R. O'Meara, Malibu, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Dec. 16, 1975, Ser. No. 641,330
Int. Cl.² H04B *9/00*
U.S. Cl. 250—199 **23 Claims**

1. An optical target imaging system, comprising in combination:
a laser transmitter providing a two pulse sequence target illuminating field, one pulse of the two pulse sequence being substantially polarized in one direction and the other of the two pulse sequence being substantially polarized in a direction orthogonal to said one pulse; and

a plural number of receivers, electromagnetically coupled to the transmitter, for receiving the illuminating field



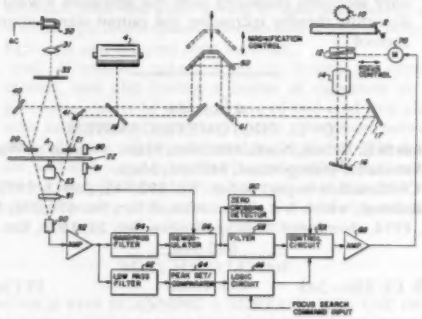
portion reflected from the target, said field portion being of a predetermined polarization state.

4,011,446

DEVICE FOR PRODUCING A SIGNAL INDICATING THE DIRECTIONAL MOVEMENT REQUIRED TO ACHIEVE FOCUS

Melvin E. Swanberg, Claremont, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 18, 1975, Ser. No. 569,425
Int. Cl.² G01J *1/20*; G01B *3/00*
U.S. Cl. 250—201 **9 Claims**



1. A device for producing a signal for controlling the focus of a lens in an optical projection system comprising:

a first stationary member having a plurality of light reflecting surfaces distributed thereon with light transparent portions between said light reflecting surfaces of said first member,

a second stationary member having a plurality of light reflecting surfaces distributed thereon with light transparent portions between said light reflecting surfaces of said second member,

means for illuminating said first and second stationary members,

means for forming an image of the light reflecting surfaces on said first and second stationary members through said lens at a remote location, the image formed at said remote location being reimaged through said lens on said light reflecting surfaces, the reimaged light being reflected back to said illuminating means if the reimaged light is in focus at said light reflecting surfaces,

a rotating optical modulator comprised of a plurality of alternate light opaque and light transparent portions, said rotating optical modulator being positioned adjacent both said first and second stationary members, the plane of said optical modulator being equidistant from the plane of said light reflecting surfaces of said first and second stationary members,

means for rotating said modulator at a substantially constant speed, and

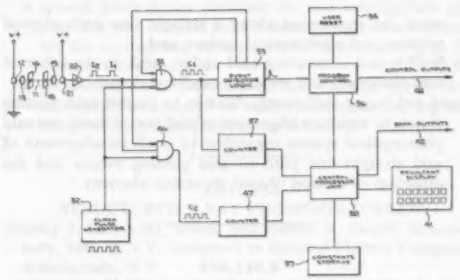
detector means positioned adjacent said optical modulator for detecting that portion of the reimaged light transmitted through the light transparent portions of said first and second stationary members and the light transparent portions of said optical modulator when said reimaged light is not in focus at said light reflecting surfaces.

4,011,447

SYSTEM FOR DETECTING THE EDGES OF A MOVING OBJECT EMPLOYING A PHOTOCELL AND AN AMPLIFIER IN THE SATURATION MODE

George R. Henderson, 6217 Picardie Road, Rancho Palos Verdes, Calif. 90274

Filed Feb. 9, 1976, Ser. No. 656,328
Int. Cl.² G01D *21/04*
U.S. Cl. 250—222 R **14 Claims**



1. A device for detecting the leading and trailing edges of a moving object comprising:

means for providing a high flux density light source,

first aperture plate means positioned in close proximity to said means for providing a high flux density light source and including an aperture for forming a high flux density light beam having a predetermined geometrical relationship to provide a uniform flux density in at least one dimension,

second aperture plate means spaced apart from said first aperture plate means to enable the moving object to pass therebetween and including a second aperture,

photo detector means positioned in close proximity to said second aperture and operated in saturation mode for providing an output signal for measuring the time interval from the point of time at which the leading edge of the moving object intersects a first predetermined location within said light beam and the point of time at which the trailing edge of the moving object intersects a second predetermined location within said light beam.

4,011,448

LINEAR SHAFT ENCODER

Michael F. Hordeski, 14831 Kitterman Drive, Silverado, Calif. 92676

Filed Aug. 8, 1975, Ser. No. 602,990
Int. Cl.² H01J *3/14*
U.S. Cl. 250—237 R **18 Claims**

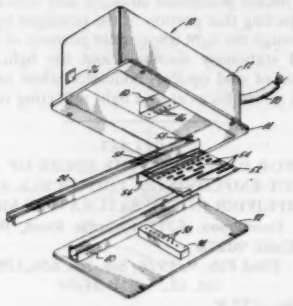
1. A self-contained linear digital encoder for measuring the relative linear dimension between a stationary machine element and a movable machine element, comprising:

a housing for mounting on one of said stationary and movable machine elements;

a photooptical system having plural photooptical sensors rigidly mounted within said housing;

a multiple track coded mask cooperating with said photooptical system, each track thereof cooperating with one of said plural photooptical sensors for generating output digital signals indicative of the relative positions of said photooptical system and said mask;

means mounted within said housing for guiding said coded



mask for movement along a straight line path aligned relative said photooptical system; and

a flexible rod connecting said coded mask to the other of said stationary and movable machine elements;

said rod being sufficiently flexible to permit said guiding means to maintain alignment of said coded mask and said photooptical system regardless of small misalignment of said straight line path of said guiding means and the direction of motion of said moveable element.

4,011,449

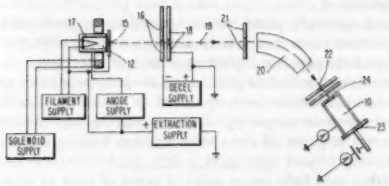
APPARATUS FOR MEASURING THE BEAM CURRENT OF CHARGED PARTICLE BEAM

Wen-Chuang Ko, Wappingers Falls, N.Y., and Erich Sawatzky, San Jose, Calif., assignors to IBM Corporation, Armonk, N.Y.

Filed Nov. 5, 1975, Ser. No. 629,181

Int. Cl.² H01J *37/00*; G01N *23/00*

U.S. Cl. 250—309 **18 Claims**



1. In apparatus for bombarding a target with a beam of charged particles, a structure for measuring the beam current at said target; comprising:

walls adjacent to and electrically insulated from said target and surrounding said beam whereby said walls and target provide a Faraday Cage,

means for biasing said target at a potential opposite the polarity of the primary particles in said beam,

means for biasing said walls at substantially ground potential,

means connected to said target for measuring said target current, and

means connected to said wall for measuring the wall current.

4,011,450

SCANNING ELECTRON DEVICE

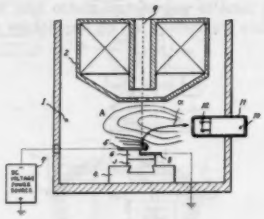
Takashi Tagawa, Nara, and Jun-Ichi Mori, Uji, both of Japan, assignors to Nihon Denshi Kabushiki Kaisha, Tokyo and Unitika Ltd., Hyogo, both of, Japan

Filed May 16, 1975, Ser. No. 577,989

Claims priority, application Japan, July 17, 1974, 49-81952

Int. Cl.² G21K *7/00*; G01N *23/00*; H01K *37/26*

U.S. Cl. 250—311 **4 Claims**



1. In a device for forming a scanning image by detecting the secondary electrons emanated from a specimen irradiated by a scanning primary electron beam, the improvement comprising

detecting means comprising an electron detector and a collector electrode maintained at a positive potential,

at least first and second auxiliary electrodes not including the collector electrode, and

a d.c. power supply for maintaining said first auxiliary electrode at a lower potential than said second auxiliary electrode, said specimen arranged nearest the first auxiliary electrode

such that an electric field is created between the specimen and the detector, said electric field directing the secondary electrons emanated from the specimen toward the detector, thereby increasing the output signal intensity thereof.

4,011,451

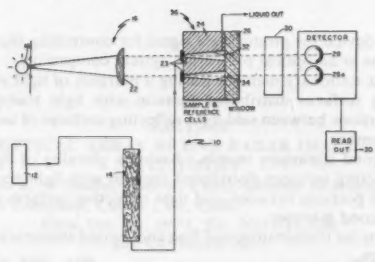
NOVEL PHOTOMETRIC SYSTEM

Kenneth E. Nelson, North Attleboro, Mass., assignor to Waters Associates, Incorporated, Milford, Mass.

Continuation-in-part of Ser. No. 592,941, July 3, 1975, abandoned, which is a continuation of Ser. No. 470,076, May 15, 1974, abandoned. This application Oct. 24, 1975, Ser. No. 625,590

Int. Cl.² G01M *21/26*

U.S. Cl. 250—343 **23 Claims**



1. In a photometer of the type utilizing a light source, a sample cell adapted to transmit a continuously-flowing liquid to be analyzed from an inlet port near one end thereof through a flowpath to an outlet port near the other end thereof, and a means for measuring the absorption of light in said sample cell, the improvement wherein said photometer comprises a

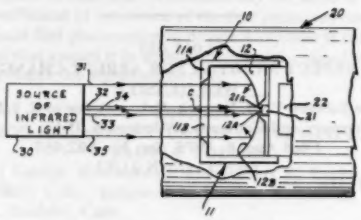
light detector forming means to receive substantially all non-absorbed light transmitted from said sample cell, means for eliminating liquid lens effects said means comprising a generally conical sample cell, a smaller end of said sample cell being nearer said light source, such that there is substantially reduced loss of light refracted by said lenses on walls of said sample cell.

4,011,452

ANTINARCISSUS REFLECTOR ASSEMBLY FOR INFRARED DETECTOR

Franklin J. Meyers, Canoga Park, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 6, 1975, Ser. No. 629,467
Int. Cl.² G01J 1/04
U.S. Cl. 250—352 **1 Claim**



1. An antinarcissus reflector assembly for use with a source of infrared light and with an infrared light detector which is a constituent component of an imaging infrared light scanner, comprising:

a. cold stop subassembly comprising a plate of suitable material, with said plate having an aperture therein, and with said plate interposed between said source of infrared light and said infrared light detector;

b. and, a concave spherical mirror having an opening therein, and also having a center of curvature at the geometric center of said aperture of said cold stop plate, with said concave spherical mirror interposed between said cold stop subassembly and said infrared light detector, and with said concave surface of said spherical mirror facing toward said cold stop aperture, and also with said mirror opening in alignment with said cold stop aperture and exposing said infrared light detector.

4,011,453

DEVICE FOR SCANNING A SURFACE FOR USE IN APPARATUS FOR DIAGNOSTIC EXAMINATION BY THE RECORDING OF SCINTILLATIONS

Wilfrid Delaby, Epinay-sur-Orge, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed June 5, 1975, Ser. No. 584,153
Claims priority, application France, June 6, 1974, 74.19484
Int. Cl.² G01M 21/34
U.S. Cl. 250—363 S **2 Claims**

1. Apparatus for scanning a body for scintillations along a surface having any one of a plurality of different orientations which are parallel to a first horizontal direction, said apparatus comprising:

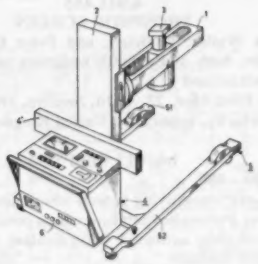
a scintillation detector;

a detector carrier arm assembly along which said detector is movable in a first horizontal direction, said detector being oriented perpendicular to said first horizontal direction and said detector carrier arm assembly being axially rotatable about said first horizontal direction, so that said detector may be oriented in any one of a plurality of different directions which are perpendicular to said first horizontal direction;

an intermediate arm assembly along which said detector carrier arm assembly is movable in the vertical direction;

a carrier arm assembly along which said intermediate arm assembly is movable in a second horizontal direction perpendicular to said first horizontal direction;

a first drive motor mounted on said carrier arm assembly and coupled to said intermediate arm assembly for moving said intermediate arm assembly in said second horizontal direction;



a second drive motor mounted on said intermediate arm assembly and coupled to said detector carrier arm assembly for moving said detector carrier arm assembly in the vertical direction; and

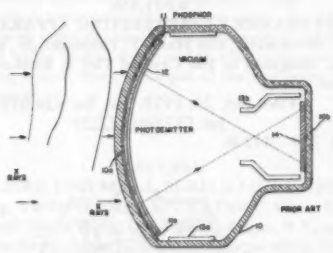
a third drive motor mounted on said detector carrier arm assembly and coupled to said detector for moving said detector in said first horizontal direction.

4,011,454

STRUCTURED X-RAY PHOSPHOR SCREEN

Stanley J. Lubowski, Scotia, and Robert K. Swank, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 28, 1975, Ser. No. 571,950
Int. Cl.² G01J 1/58
U.S. Cl. 250—483 **7 Claims**



1. An improved *x*-ray phosphor screen comprising:

a supporting substrate having a surface including a large plurality of small raised portions, adjacent ones of said raised portions being separated by relatively depressed portions therebetween;

a large plurality of columns of an *x*-ray phosphor material, each column having opposed first and second end surfaces, only said first end surface being positioned on and in contact with one of said plurality of raised portions, said plurality of columns being spaced from each other by an appreciable gap of dimension coresponding generally to the width of said depressed portions of said substrate, said phosphor columns being substantially transparent to the radiation emitted by said phosphor material; and

a reflecting substance positioned essentially completely throughout said gaps, and surrounding each of said phos-

phor columns only along substantially the entire height and not upon said end surfaces thereof to substantially inhibit radiation emitted by the phosphor material in each column from leaving the side walls of said column and entering a different column, the radiation being reflected back into the columns so as to ultimately leave said second end surface of substantially only that column in which said radiation is initially emitted.

4,011,455
PHOSPHOR SCREEN

Alan Hugh Waller, Rayleigh, and Peter Charles Sangway, Upminster, both of England, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed Mar. 22, 1976, Ser. No. 669,353

Claims priority, application United Kingdom, Apr. 4, 1975, 13885/75

Int. Cl.² G01J *1/58*

U.S. Cl. 250—486 **10 Claims**

1. An X-ray intensifying screen which comprises in a fluorescent layer a phosphor mixture which consists of an alkaline earth fluorohalide activated with divalent europium having the empirical formula

$$[Ba_{1-x-y-p}Sr_xCa_yEu_p]\ F\ [Cl_{1-a-b}Br_aI_b]$$

where

$y \leq 0.20$

$x+y+p \leq 1$

$a+b \leq 1$

$0.001 \leq p \leq 0.20$

together with at least one phosphor which is either calcium tungstate or which is a rare earth oxychalcogenide having the formula

$$[M_{1-x}A_x]_2\ O_2Ch$$

wherein M is at least one rare earth host element, A is an activator which is a rare earth element different from M and which has an atomic number from 59 to 71, Ch is sulphur, selenium or tellurium and $0.001 \leq x \leq 0.2$.

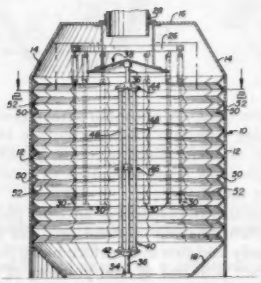
4,011,456
ULTRAVIOLET IRRADIATING APPARATUS

John R. Bredewater, and Mario F. Thumudo, Jr., both of Ada, Okla., assignors to The General Tire & Rubber Company, Akron, Ohio

Filed Oct. 20, 1975, Ser. No. 624,072

Int. Cl.² H01J *37/20*

U.S. Cl. 250—492 R **18 Claims**



1. An improved ultraviolet irradiating apparatus comprising:

a. a generally enclosed upright cylindrical housing defining an entry opening and an exit opening;

b. a linear ultraviolet radiation source vertically mounted generally along the central axis of the housing;

c. multiple sections of reflectors formed to be shaped as zig-zag reflectors disposed around the cylindrical interior of said housing with the corners of the angles between said zig-zag reflectors being disposed generally transversely to the length of said radiation source;

d. said zig-zag reflectors presenting specular surfaces to said radiation source, said surfaces being adapted to reflect about 80% of the direct ultraviolet rays from said radiation source;

e. said reflectors being formed from specular aluminum sheet;

f. a parts conveyor mounted to convey parts into said entry opening, then through a path between said radiation source and said reflectors and then out through said exit opening; and

g. said zig-zag reflectors causing said parts carried by said conveyor to be subjected to a greater and more concentrated exposure to ultraviolet radiation which is more evenly distributed to all external surfaces of said parts.

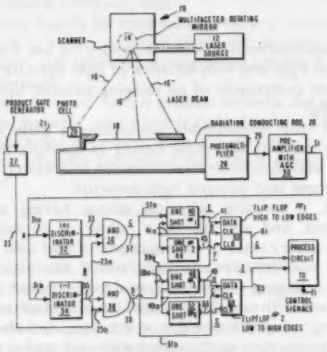
4,011,457
WEB DEFECT MONITOR FOR ABRUPT CHANGES IN WEB DENSITY

William Edward Wolf, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 6, 1975, Ser. No. 602,465

Int. Cl.² G01N *21/32*

U.S. Cl. 250—563 **5 Claims**



1. In a method of inspecting a web that includes detecting density variations in the web by electrooptically scanning the web and generating output signals representative of said variations, the improvement comprising: generating signals when the amplitudes of said output signals exceed predetermined positive and negative threshold levels in either order of occurrence; and indicating when an output signal exceeding one of said threshold levels changes in level and exceeds the other threshold level within a predetermined period of time.

4,011,458
PHOTOELECTRIC DETECTOR WITH LIGHT SOURCE INTENSITY REGULATION

William J. Malinowski, Pembroke, Mass., assignor to Pyrotector, Incorporated, Hingham, Mass.

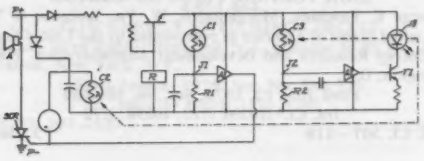
Filed Oct. 9, 1975, Ser. No. 621,085

Int. Cl.² G01N *21/28*

U.S. Cl. 250—564 **11 Claims**

1. A detector, comprising a light source, a first photo-resistive device positioned to receive only light reflected from a medium to be detected, a second photo-resistive device positioned to receive light directly from the light source, means responsive to the decrease in resistance of the first photo-resistive device to a predetermined resistance to actuate a

signalling device, means for regulating the intensity of the light source, means responsive to increases and decreases in resistance of the second photo-resistive device to cause the light source regulating means to decrease and increase, respectively the intensity of the light source said regulating means maintaining the intensity of the light source at a predeter-

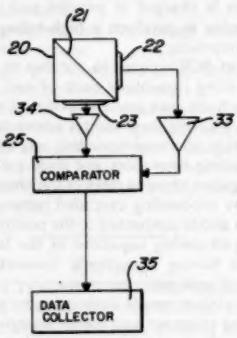


mined intensity such that the second photo-resistive device is continuously exposed to the light level at which its thermal co-efficient of resistance is substantially the same as the thermal coefficient of resistance of the first photo-resistive device when said first photo-resistive device is exposed to the amount of light that causes it to drop to the predetermined resistance that actuates the signalling device.

4,011,459
METHOD AND APPARATUS FOR DETERMINING VALID SAMPLE VOLUME

Robert George Knollenberg, and Robert E. Luehr, both of Boulder, Colo., assignors to Particle Measuring Systems, Inc., Boulder, Colo.

Filed Dec. 5, 1975, Ser. No. 638,015
Int. Cl.² G01N *21/26*; H01J *39/12*
U.S. Cl. 250—576 **15 Claims**

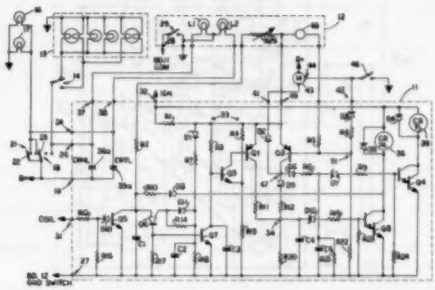


1. Apparatus for defining a valid sample volume comprising:
means for providing a beam of radiation, imaging system means having an object plane and an image plane positioned to receive the beam of radiation, a beam splitter positioned between the object plane and the image plane to provide multiple image planes, a plurality of photosensors positioned one each in the image planes produced by the beam splitter with at least one of the photosensors being partially masked, comparator means connected to the outputs from the photosensors, and means for providing samples in the radiation beam, whereby samples within a predetermined defined sample volume are focused primarily on the masked section of the photosensor and produce a signal of less magnitude than that from the other photosensor thereby indicating acceptable data, and samples positioned outside of the predetermined sample volume fall primarily outside of the masked area and produce a signal greater than that from the other photosensor indicating invalid data.

4,011,460
CONTROL FOR ACTIVATING MOTOR VEHICLE ELECTRICAL LOAD

Richard A. Kniesly, 1734 St. Louis Drive, Kokomo, Ind. 46901; Larry L. Colville, 2718 Dakota, Anderson, Ind. 46012, and Jerrold L. Mullen, 5311 Beth Drive, Anderson, Ind. 46011

Division of Ser. No. 470,971, May 17, 1974, Pat. No. 3,909,619. This application Apr. 14, 1975, Ser. No. 568,013
Int. Cl.² H02G *3/00*
U.S. Cl. 307—10 LS **1 Claim**



1. A control for activating a lighting circuit in a motor vehicle comprising:
a motor vehicle lighting circuit;
control means for coupling electrical power to the lighting circuit when the control means is energized;
ignition circuit means, having a first electrical signal output;
reference circuit means for producing a reference electrical signal;
comparison circuit means, coupled to the ignition circuit means and to the reference circuit means, for energizing the control means when the first electrical signal output differs from the reference electrical signal by a pedetermined amount;
a windshield wiper motor having a first terminal which is energized by a motor vehicle power source when the windshield wiper motor is in operation; and
said control means includes a first relay circuit means, having an input coupled to the first terminal of the windshield wiper motor, for coupling electrical power to the lighting circuit when the input of the first relay means is energized.

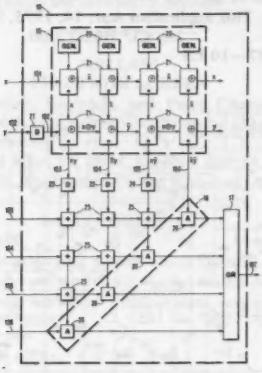
4,011,461
PIPELINED UNIVERSAL BUBBLE LOGIC ARRAY

Hsu Chang, Yorktown Heights, N.Y.; Tien C. Chen, San Jose, Calif., and Share-Young Lee, Lake Mohegan, N.Y., assignors to International Business Machines Corporation, Yorktown Heights, N.Y.

Continuation of Ser. No. 488,876, July 15, 1974, abandoned. This application July 17, 1975, Ser. No. 596,932
Int. Cl.² G11C *11/14*; H03K *19/168*
U.S. Cl. 307—88 LC **24 Claims**

1. A bubble logic array for performing a logic function on a set of input data in the form of a bubble domain pattern and producing a logical output responsive thereto, also in the form of a bubble domain pattern, said logic array comprising,
a data input bubble propagation path including n input paths for accepting n bubble inputs comprising data,
a bubble decoder means with an input and an output, means connecting said data input to said decoder means input, said decoder means output including 2^n decoder output paths, each of said decoder output paths providing one of the possible 2^n combinations of said input data in the form of said bubble domain pattern,

bubble logic means connected to each of said decoder output paths including a plurality of AND gates, each with at least two inputs and an output, one AND gate input receiving data from each of said decoder output paths,



an OR gate with 2^n inputs, one input connected to each of said AND gate outputs,

a plurality of 2^n bubble control inputs, each connected to a different one of said other inputs of said AND gates,

said plurality of control inputs defining the logic function performed by said array by said bubble domain pattern.

4,011,462

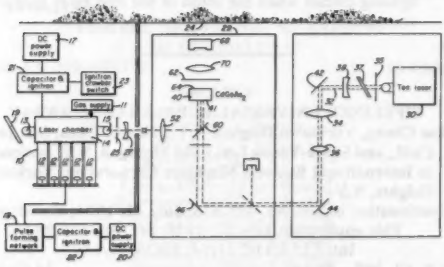
PULSED INFRARED DIFFERENCE FREQUENCY GENERATION IN $CdGeAs_2$

Martin S. Piltch; John P. Rink, and Charles R. Tallman, all of Los Alamos, N. Mex., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Nov. 26, 1975, Ser. No. 635,457

Int. Cl.² H02M *5/04*

U.S. Cl. 307—88.3 **3 Claims**



1. A laser apparatus for generating a pulsed difference frequency comprising:

an electron beam, pre-ionized CO laser having a single line output wavelength substantially between 5.0 microns and 6.5 microns;

a CO_2 TEA laser having a single line output;

mixing means for mixing the output of said CO laser and said CO_2 laser including a Ge dielectric coated beam splitter and a single crystal of chalcopyrite $CdGeAs_2$ providing a line-tunable difference frequency output; and

filter means for removing unwanted wavelengths from the output of said mixing means, producing an output wavelength discretely line-tunable between substantially 3.5 microns to substantially 18 microns spaced less than 0.1 cm^{-1} apart.

4,011,463

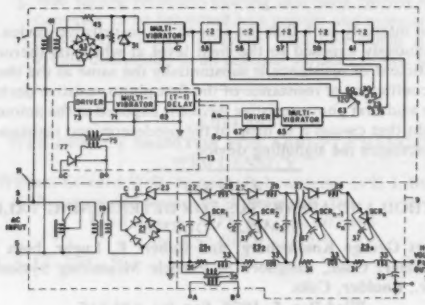
HIGH VOLTAGE PULSE GENERATOR

George E. Fasching, Morgantown, W. Va., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed June 12, 1975, Ser. No. 586,460

Int. Cl.² H02M *7/12*; **H03K** *3/72*

U.S. Cl. 307—110 **3 Claims**



1. In a high-voltage pulse generator wherein a plurality of charge-storing capacitors are connected, respectively, in a corresponding plurality of cascaded charging networks so that each capacitor is charged in parallel and subsequently discharged in series to produce a high-voltage pulse, the improvement comprising:

a plurality of SCR's equal in number to said plurality of charge-storing capacitors, each of said SCR's having an anode, cathode, and gate electrode, all but at least one of said SCR's having their anodes connected to the positive charged side of a corresponding one of said plurality of charge-storing capacitors and their cathodes connected to the negative charged sides of the charge-storing capacitor of the succeeding cascaded network, said last SCR having its anode connected to the positive charged side of the charged-storing capacitor of the last cascaded network and having its cathode connected to an output terminal of said pulse generator;

a charging circuit means responsive to a fixed frequency alternating reference voltage for applying a pulsating d.c. charging voltage to said charge-storing capacitors of said cascaded network;

a triggering circuit for providing triggering signals to the gate electrode of a first one of said plurality of SCR's at selected intervals when no charging voltage is being applied to said charge-storing capacitors including a first full wave rectifier connected to receive said alternating voltage signal at an input thereof and producing full wave rectifier pulses at an output thereof, a plurality of cascaded pulse dividers connected to the output of said first rectifier, each divider reducing the pulse rate applied to the input thereof by a factor of two, a selector switch having a plurality of contacts one greater in number than said plurality of dividers, each contact connected to a separate divider output and said one contact connected to receive the output pulses from said first rectifier, and output circuit means for connecting the common terminal of said selector switch to the gate of said first SCR so that the high-voltage pulse rate may be selected through said selector switch; and

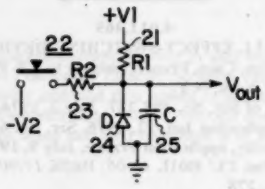
a plurality of triggering capacitors connected between the anode and gate electrode, respectively, of the remaining

plurality of SCR's so that when a triggering signal is applied to the gate electrode of said first SCR the remaining plurality of SCR's are triggered sequentially to switch said charge-storing capacitors into a series discharge mode, generating a high-voltage pulse at said output terminal.

4,011,464
LOW ENERGY SWITCHING CIRCUIT

Anthony Drea Robbi, Hopewell, N.J., assignor to RCA Corporation, New York, N.Y.

Filed June 6, 1975, Ser. No. 584,379
Int. Cl.² H01H *1/50, 1/60*
U.S. Cl. 307—137 **3 Claims**



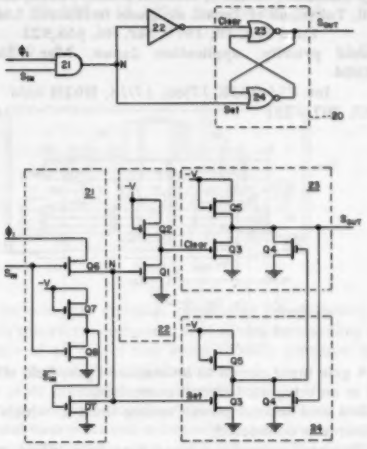
1. The combination comprising:
switch means selectively operable to couple first and second terminals electrically;
first, second, and third voltage level means for providing three voltage levels such that said first voltage level is highest, said second voltage level is lowest, and said third voltage is intermediate between said first and second voltage levels;
output terminal means;
resistance for coupling said first voltage level means to said output terminal means;
means for coupling said second voltage level means to said first terminal of the switch means;
impedance means for coupling said second terminal of the switch means to the output terminal means; and
diode means for coupling said third voltage level means to said output terminal means in a direction whereby the voltage at said output terminal means is not less than said third voltage level.

4,011,465
MOSFET DETECTING AND SYNCHRONIZING CIRCUIT FOR ASYNCHRONOUS DIGITAL DATA

Cesar E. Alvarez, Jr., Griffith, Ind., assignor to Teletype Corporation, Skokie, Ill.

Filed Sept. 2, 1975, Ser. No. 609,265
Int. Cl.² H03K *19/08, 1/17, 5/13, 3/26*
U.S. Cl. 307—208 **5 Claims**

1. A circuit for detecting changes of state in an asynchronous input pulse train and forming an output pulse train synchronized to a local clock, said output pulse train being representative of the detected state changes comprising:
a single pass transistor of the metal-oxide-semiconductor input having two controlled electrodes and a control electrode, the control electrode and one of the controlled electrodes serving as input electrodes and the local clock being applied to one input electrode and the asynchronous input pulse train being applied to the other input electrode, a coincident output being produced at the other controlled electrode;
latching means having two inputs for forming an output signal having alternatively a first and second state;
means for coupling the coincident output of said other controlled electrodes to each of the two inputs of the latching means; and
a capacitor, said capacitor being a transistor of the metal-oxide-semiconductor type having two controlled electrodes and a control electrode, the controlled electrodes

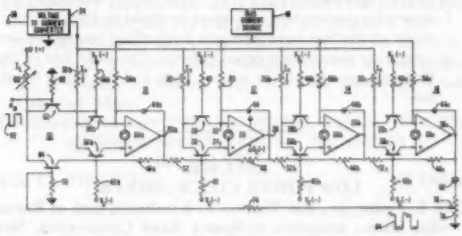


being connected in common to the one input electrode of the pass transistor and the control electrode being connected to the other input electrode of the pass transistor.

4,011,466
DYNAMIC FILTER

Alan R. Pearlman, Newton, and Timothy C. Gillette, Brookline, both of Mass., assignors to ARP Instruments, Inc., Newton, Mass.

Filed May 10, 1976, Ser. No. 684,788
Int. Cl.² H03K *17/02;* **H03B** *1/00;* **H03F** *1/36*
U.S. Cl. 307—229 **14 Claims**



1. A dynamic filter comprising
A. a plurality of cascaded filter stages, each including
1. a current amplifier having an inverting input terminal, a non-inverting input terminal, and an output terminal
2. an integrating capacitor connected between the inverting terminal and the output terminal thereof,
3. first and second matched bipolar transistors having their collectors connected to the inverting and non-inverting input terminals, respectively, and their emitters connected in common to a current source for supplying emitter current thereto, said transistors being connected to operate at substantially constant transconductance,
4. first and second resistors coupling the bases of said first and second transistors, respectively, to a common potential,
5. a feedback resistor connected between the output terminal and the base of one of said transistors,
6. means applying a signal to be filtered to the base of one of said transistors.

4,011,467
GATE INPUT CIRCUIT FOR INSULATED GATE FIELD EFFECT TRANSISTORS

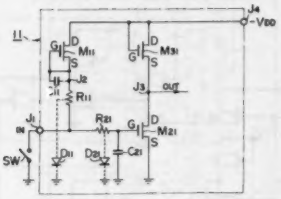
Shunji Shimada, Kodaira; Kenichi Ohba, Fuchu, and Shigeo Ishii, Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 18, 1976, Ser. No. 658,922

Claims priority, application Japan, Mar. 26, 1975, 50-35604

Int. Cl.² H03K *17/60, 17/16;* **H02H** *9/04*

U.S. Cl. 307—251 **6 Claims**



1. A gate input circuit to an insulated gate field effect transistor in an integrated circuit comprising:

a. first and second power source lines to which a power source is connected;

b. first and second insulated gate field effect transistors connected in series between the first and second power source lines for constituting an inverter circuit, said first insulated gate field effect transistor acting as a driver transistor and said second insulated gate field effect transistor acting as a load transistor;

c. an input terminal;

d. a third insulated gate field effect transistor of depletion type with a control electrode and first and second output electrodes, said control electrode being connected to the first output electrode and said second output electrode being connected to one line of the first and second power source lines;

e. a resistor connected between the input terminal and the first output electrode of the third insulated gate field effect transistor;

f. means for connecting the input terminal to the gate electrode of the first insulated gate field effect transistor; and

g. switching means connected between the other line of the first and second power source lines and the input terminal.

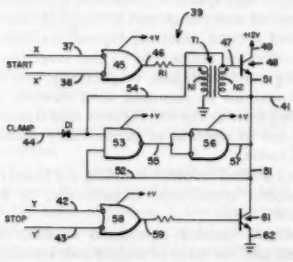
4,011,468
LOW POWER CLOCK DRIVER

Dick E. Fosler, Jr., and Thomas L. Krocheski, both of Burnsville, Minn., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Oct. 1, 1975, Ser. No. 618,596

Int. Cl.² H03K *1/00, 3/26, 4/00, 5/01*

U.S. Cl. 307—270 **12 Claims**



1. A low power dissipation clock circuit comprising:

a normally off set side input driver for receiving clock pulse starting signals,

a normally off set side output driver having an input coupled to said set side input driver and an output connected to an output of clock pulses,

a normally off reset side input driver for receiving clock stopping signals,

a normally off reset side output driver having an input coupled to said reset side input driver and an output connected to said output of clock pulses, and

normally off bistable clamping means comprising at least two inputs and at least one output, one of said inputs and said output being connected to said output of clock pulses, and one of said inputs being connected to the input of said normally off set side output driver.

4,011,469
HALL EFFECT-SWITCHING DEVICE

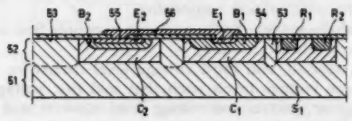
Claude Chapron, Caen, France, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 485,227, July 2, 1974, abandoned. This application Jan. 12, 1976, Ser. No. 648,397

Claims priority, application France, July 9, 1973, 73.25035

Int. Cl.² H01L *43/06;* **H03K** *17/90*

U.S. Cl. 307—278 **4 Claims**



1. In an integrated semiconductor device of the type having

a Hall element responsive to a magnetic field for producing between two Hall electrodes of the Hall element a Hall voltage having two different values corresponding to two different states of the magnetic field and

a differential switching unit responsive to the Hall voltage and having two different stable states,

an improved prebiasing means for aligning the switching region of the differential switching unit with the range of Hall voltage values so that the two different stable states of the differential switching unit correspond to the two different states of the magnetic field, the improved prebiasing means comprising an improved input differential stage for the differential switching unit, which comprises:

two transistors each having a base zone of the same conductivity type and an emitter zone forming a base-emitter junction therewith,

said emitter zones being held at the same voltage potential with respect to each other,

said base zones being electrically connected to said Hall electrodes,

and said base-emitter junctions in said integrated semiconductor device formed with unequal areas so as to effect said prebiasing of the switching unit.

4,011,470
CIRCUIT UTILIZING OPEN-BASE TRANSISTOR AS LEAKAGE BYPASS DEVICE

William Folsom Davis, Tempe, Ariz., and Thomas Marinus Frederiksen, San Jose, Calif., assignors to Motorola, Inc., Chicago, Ill.

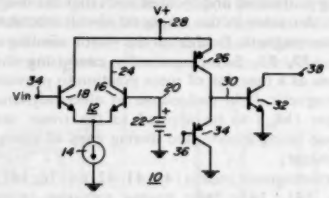
Continuation of Ser. No. 502,258, Aug. 30, 1974, abandoned, which is a continuation of Ser. No. 317,972, Dec. 26, 1972, abandoned. This application Mar. 25, 1976, Ser. No. 670,497

Int. Cl.² H03K *1/12*

U.S. Cl. 307—297 **9 Claims**

1. An integrated circuit including first and second power conductors coupled thereto, a first transistor, and a second transistor having a base electrode coupled to input circuit

means of said integrated circuit and having its emitter coupled to said first power conductor, and having its base connected to a collector of said first transistor, said first transistor having its emitter coupled to said second power conductor, said integrated circuit comprising open-base transistor means bypass-



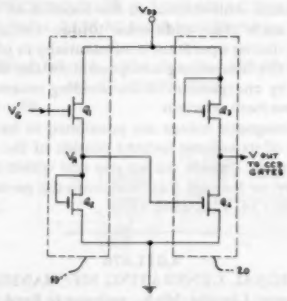
ing reverse leakage current flowing in said collector of said first transistor connected directly between said base of said second transistor and said first power conductor for holding said second transistor in an "off" condition over a wide temperature range when said first transistor is in an "off" condition.

4,011,471

SURFACE POTENTIAL STABILIZING CIRCUIT FOR CHARGE-COUPLED DEVICES RADIATION HARDENING

Leonard R. Rockett, Jr., New York, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 18, 1975, Ser. No. 633,131
Int. Cl.² H03K *1/02*, *1/10*; H01L *27/14*
U.S. Cl. 307—308 **3 Claims**



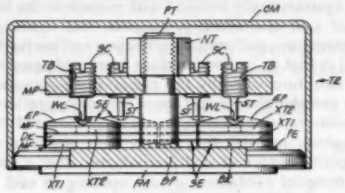
1. A surface potential stabilizing circuit for charge-coupled device radiation hardening comprising first and second MOSFET devices, in combination, forming a source follower stage, said first MOSFET device having a first predetermined threshold voltage and operating as an input device to receive an applied voltage, V_G', said source follower stage modifying said applied voltage, V_G', by an amount equal to said first predetermined threshold voltage, said second MOSFET device being a saturated MOS load for said source follower stage, third and fourth MOSFET devices, in combination, forming an inverter stage, said fourth MOSFET device having a second predetermined threshold voltage, the modified applied voltage from said source follower stage being received by said fourth MOSFET device to offset any threshold voltage error to appear at the stabilized circuit output with the stabilized circuit output voltage being the sum of V_G' and said second predetermined threshold voltage, said third MOSFET device operating as a saturated MOS load for said inverter stage.

4,011,472

ACOUSTIC EMISSION TRANSDUCER

Ching C. Feng, San Clemente, Calif., assignor to Becton, Dickinson Electronics Company, San Juan Capistrano, Calif.

Filed May 13, 1975, Ser. No. 577,035
Int. Cl.² H01L *41/04*
U.S. Cl. 310—8.1 **15 Claims**



1. In an acoustic emission transducer for detecting high frequency transverse components of vibrations traveling along the surface of an object that emits acoustic emission signals from parts thereof, the combination of:

a base plate attachable to said surface;

a plurality of electromechanical sensor elements mounted on said base plate and selectively responsive to vibrations normal to said base plate, each said sensor comprising at least one piezoelectric member and being adapted to produce electrical signals at its output corresponding to forces acting on said sensors in a direction normal to said base plate;

a plurality of adjustable means secured relative to said base plate for adjustably compressing said sensor elements against said plate; and

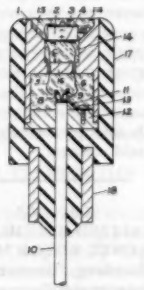
means for interconnecting the electrical outputs of said sensors to combine the electrical signals produced by them.

4,011,473

ULTRASONIC TRANSDUCER WITH IMPROVED TRANSIENT RESPONSE AND METHOD FOR UTILIZING TRANSDUCER TO INCREASE ACCURACY OF MEASUREMENT OF AN ULTRASONIC FLOW METER

Frank Massa, Cohasset, Mass., assignor to Fred M. Dellorfano, Jr. & Donald P. Massa, Trustees of the Stoneleigh Trust, Cohasset, Mass.

Continuation-in-part of Ser. No. 500,391, Aug. 26, 1974. This application Nov. 28, 1975, Ser. No. 636,054
Int. Cl.² H01L *41/08*
U.S. Cl. 310—8.2 **11 Claims**



1. An electroacoustic transducer comprising a housing structure having an opening, a piezoelectric disc having a first and second parallel plane surface and third peripheral edge surface, said disc characterized in that it may be set into vibration at a frequency in the vicinity of its planar resonant

vibrational mode, means for locating side disc within said opening in said housing structure so that the first of said parallel plane surfaces is located opposite said opening and the peripheral edge surface of said disc is circumferentially spaced from the wall surface of said housing structure, an annular sound reflecting surface located within said housing and uniformly spaced about a peripheral edge surface of said piezoelectric disc, said annular reflecting surface characterized in that it is symmetrically inclined with respect to the first plane surface of said disc which is opposite said opening in said housing structure, said annular reflecting surface further characterized in that its inclined surface faces said opening in said housing structure whereby the radiation of acoustic energy from the peripheral edge surface of said disc is reflected from said annular reflecting surface and is propagated from said opening along an axial direction at right angles to said first parallel plane surface of said piezoelectric disc, a sound conducting material contained in said opening in said housing, said sound conducting material makes intimate contact with said first plane surface of said disc and with said peripheral edge surface of said disc and also with said inclined annular reflecting surface which surrounds said disc.

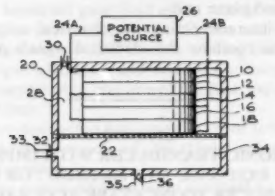
4,011,474
PIEZOELECTRIC STACK INSULATION

Cormac G. O'Neill, Lafayette, Calif., assignor to PZ Technology, Inc., San Leandro, Calif.

Continuation-in-part of Ser. No. 511,787, Oct. 3, 1974, abandoned. This application Dec. 19, 1975, Ser. No. 642,309

Int. Cl.² H01L *41/08*

U.S. Cl. 310—8.7 **14 Claims**



1. In apparatus of the type employing a plurality of piezoelectric discs having flat surfaces which are stacked serially, which have a dielectric medium applied to their radial surfaces, and which have a voltage applied to the opposing surfaces of said discs for the purpose of causing them to change their radial dimension in response thereto, said voltage having a rise time or fall time such that the particle velocity of the piezoelectric material exceeds the particle velocity of said dielectric medium when said voltage is applied resulting in a separation therebetween, the improvement comprising

applying pressure continuously to said dielectric medium to increase its particle velocity to a value at which it will compensate for separation caused by the difference between its particle velocity and the particle velocity of said piezoelectric material to maintain said dielectric medium in contact with said piezoelectric material during the application of said voltage.

4,011,475
TORQUE EQUALIZED BRUSHLESS PERMANENT MAGNET ROTOR MOTOR

Fritz Schmider, Hornberg, Germany, assignor to Papst-Motoren KG, Schwarzwald, Germany

Filed June 20, 1974, Ser. No. 481,563

Claims priority, application Germany, June 23, 1975, 2332012; Nov. 21, 1973, 2358030

Int. Cl.² H02K *11/00*

U.S. Cl. 310—68 R **38 Claims**

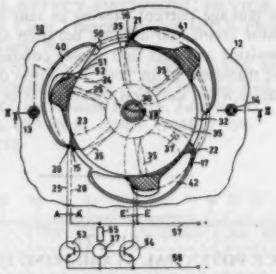
1. In a brushless, permanent magnet rotor motor having a stator structure (**12**) including winding means (**20, 21, 22; 220, 221**) which, when energized, generate an electromagnetic field;

a permanent magnet rotor (**34, 130, 234**);

means (**32, 33**) forming a direct magnetic circuit including the winding means, the rotor, and an air gap, the rotor being journalled and located such that the magnetic field from the rotor in the magnetic circuit interacts with the electromagnetic field from the stator winding means;

means (**37, 53, 54**) periodically energizing the winding means as a function of rotor position to provide the electromagnetic field and cause an electrodynamic driving torque (M_{et}) to be applied to the rotor, said driving torque being interrupted during gaps of energization of the stator;

and ferromagnetic means (**40, 41, 42; 61; 76; 101; 133, 134; 142; 241, 242; 260**) having soft-iron characteristics,



stationary with respect to the rotor, said ferromagnetic means generating, during operation, an additional torque (M_{ret}) effective as a positive driving torque during the gaps of generation of the electrodynamic driving torque (M_{et}) due to the gaps of energization of the said winding means, said soft-iron ferromagnetic means being shaped, and located with respect to the location of the winding means such that additional torque (M_{ret}) produced thereby during operation is substantially in phase opposition to the alternating component of the torque (M_{et}) caused by energization of the winding means;

the improvement wherein

said ferromagnetic means are positioned to have at least a portion of its volume located outside of the direct magnetic circuit, outside the air gap and within the range of the stray, or leakage flux field from the permanent magnet rotor (**34, 130, 234**).

4,011,476
SIGNAL GENERATING MECHANISM

Garry E. Beard, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

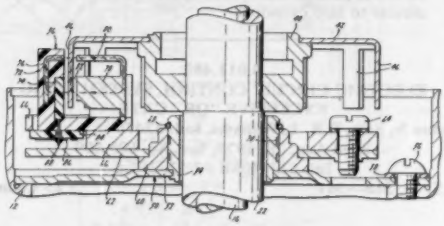
Filed Dec. 22, 1975, Ser. No. 643,417

Int. Cl.³ F02P *1/00*; H02K *11/00*

U.S. Cl. 310—70 R **3 Claims**

1. A signal generating mechanism for producing a pulsating DC electrical signal having a frequency proportional to the angular velocity of a rotating shaft, said signal generating mechanism comprising, in combination: a baseplate fixed relative to said rotating shaft, said baseplate having an opening therein; an annular bushing affixed in said baseplate opening, said bushing extending above said baseplate, said shaft passing through said bushing; a stator assembly, said stator assembly including an annular hub positioned around the portion of said bushing extending above said baseplate, said hub being rotatable about said bushing, a lower plate parallel to said baseplate and affixed to said hub, an upper plate formed from a nonmagnetic material and attached to said lower plate, a support structure attached to said upper plate, a permanent magnet mounted in said support structure, said permanent

magnet having its poles oriented to produce a magnetic flux in a direction radial with respect to said shaft, a Hall effect sensor and integrated circuit package mounted in said support structure and positioned in radial alignment with magnetic flux emanating from said permanent magnet, said Hall effect sensor and integrated circuit package being separated from said permanent magnet by an air gap, a printed circuit board having conductive elements positioned between said support structure and said lower plate, said Hall effect sensor and integrated circuit package having lead wires electrically con-



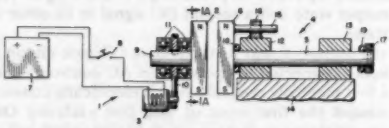
nected to said conductive elements of said printed circuit board, and pole-pieces associated with said support structure and permanent magnet to provide a flux path; and a rotor attached to said shaft for rotation therewith, said rotor having cup-shaped and depending vanes extending in the axial direction of said shaft and positioned to come into and go out of said air gap as said rotor rotates with said shaft, said vanes short-circuiting magnetic flux emanating from said permanent magnet when said vanes are within said air gap between said permanent magnet and said Hall effect sensor and integrated circuit package.

4,011,477

APPARATUS USING VARIATIONS IN MAGNETIC FORCE TO RECIPROCATE A LINEAR ACTUATOR

Harold W. Scholin, 1125 N. Northwest Highway, Park Ridge, Ill. 60068

Filed July 19, 1974, Ser. No. 489,999
Int. Cl.² H02K *7/06*
U.S. Cl. 310—80 **4 Claims**



1. An apparatus for converting variations in magnetic force into linear motion of an associated device, the combination comprising:

a. a first shaft mounted for rotation,

b. a first elongated permanent bar magnet having the ends thereof of opposite polarity and mounted at substantially the longitudinal center thereof on one end of said first shaft and rotatable therewith,

c. motor drive means for rotating said first shaft and the magnet mounted thereon,

d. a second, shaft spaced from said first shaft in axial alignment therewith mounted for linear reciprocating movement in the axial direction thereof and adapted to be associated with a mechanism to be operated thereby,

e. mounting means for guiding said second shaft in the linear reciprocating movement thereof,

f. a second elongated permanent bar magnet having the ends thereof of opposite polarity and mounted at substantially the longitudinal center thereof on the end of said second shaft adjacent said first magnet,

g. means for restraining said second magnet against rotational movement, thereby requiring said second shaft and its magnet to reciprocate only in a linear direction,

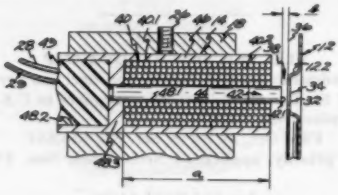
h. said first magnet, when rotated, being effective to alternately repel and attract said second magnet in response to changes in magnetic forces between said magnets, and thereby reciprocate said second shaft.

4,011,478

MAGNETIC SPEED SENSING MECHANISM

Arthur L. Reenstra, Hopkinton, N.H., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed June 2, 1975, Ser. No. 583,009
Int. Cl.² H02K *21/38*
U.S. Cl. 310—155 **15 Claims**



1. A variable reluctance speed sensing mechanism for use in a skid control system comprising an exciter wheel having a plurality of ferromagnetic portions of selected width disposed in equally spaced relation to each other around the periphery of said exciter wheel, said exciter wheel being adapted to be mounted for rotation with a motor vehicle wheel whose speed is to be monitored for moving said ferromagnetic portions in a plane through a station at a rate corresponding to the speed of rotation of the vehicle wheel, and a magnetic sensor adapted to be mounted at said station, said sensor comprising a wire sensing coil having a selected number of coil turns and having a tubular configuration of a selected length, and a permanent magnet of a rare earth-cobalt material, said magnet having a rod configuration of a relatively much shorter length than said coil disposed within the coil at a first end thereof and having one magnet pole face disposed in selected closely spaced relation to the plane of movement of said ferromagnetic portions of said exciter wheel, whereby the reluctance of a magnetic circuit established by said permanent magnet is varied by movement of said ferromagnetic portions through said station to induce an electrical signal in said coil having a frequency corresponding to the speed of movement of said motor vehicle wheel.

4,011,479

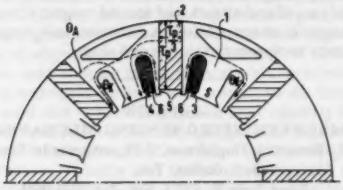
STATOR CONSTRUCTION FOR A PERMANENT MAGNET-EXCITED D-C MACHINE

Wolfgang Volkrodt, Bad Neustadt,Saale, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Dec. 15, 1975, Ser. No. 640,960
Claims priority, application Germany, Dec. 20, 1974, 2460630
Int. Cl.² H02K *1/10*
U.S. Cl. 310—186 **1 Claim**

1. In a permanent magnet-excited d-c machine including a stator, a plurality of flux-conducting pieces disposed in said stator, and a plurality of tangentially magnetized permanent magnets disposed in said stator between each of said flux-conducting pieces, the improvement comprising compensation slots disposed in said flux-conducting pieces on both sides of each of said permanent magnets, said slots each forming a compensation tooth on said flux-conducting pieces between each of said slots and said permanent magnets, and a winding disposed in said slots adjacent each magnet and looped around each said magnet and each compensation tooth disposed

between said slots, so as to form counter-ampere-turns in said pieces for compensating armature-ampere-turns in said pieces



thereby providing a reversing zone for commutation in said machine.

4,011,480

ELECTRIC DISCHARGE LAMP

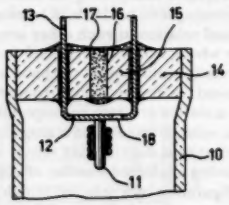
Cornelis Adrianus Joannes Jacobs, and Bart van der Leeuw, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 29, 1975, Ser. No. 626,611

Claims priority, application Netherlands, Nov. 14, 1974, 7414846

Int. Cl.² H01J *61/06*

U.S. Cl. 313—217 **9 Claims**



1. An electric discharge lamp having a tubular discharge vessel of ceramic which is sealed by means of an annular and a cylindrical ceramic moulding between which a tubular metal current leadthrough member is accommodated, characterized in that the current leadthrough member consists of a metal chosen from the group consisting of tungsten, molybdenum, rhenium and alloys thereof, and that said member is connected in a vacuum-tight manner to the two ceramic mouldings by means of sealing ceramic.

4,011,481

MODULAR ELECTRON DISCHARGE DEVICE

Donald H. Preist, San Mateo, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed Oct. 28, 1975, Ser. No. 625,962

Int. Cl.² H01J *1/46, 21/10*

U.S. Cl. 313—302 **12 Claims**

1. A grid controlled electron discharge device comprising an anode and a plurality of electron source modules, each module comprising,

an elongated support member,

an electron emissive cathode in the form of an elongated cylinder, mechanically mounted on said support member, and

an electron permeable grid mechanically mounted on said support member, at least a portion of said grid positioned between said cathode and said anode,

at least one of said cathode and said grid being electrically insulated from said support member,

said source modules being mounted with said cylindrical cathodes parallel and spaced apart in a direction perpendicular to said cylinders.

4,011,482

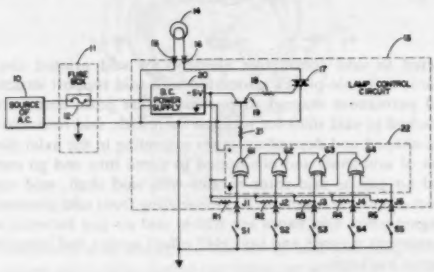
ELECTRIC CIRCUIT CONTROL SYSTEM USING EXCLUSIVE "OR" GATE

James N. Seib, R.R. 1, Williams, Ind. 47470

Filed Aug. 28, 1975, Ser. No. 608,509

Int. Cl.² H05B *37/02, 39/06*

U.S. Cl. 315—361 **15 Claims**



1. An electrical load control circuit for remotely selectively energizing or de-energizing an electrical load which comprises:

a. an AC supply source;

b. an electrical load;

c. a DC operated AC control means for controlling the power applied to said electrical load from said AC supply source;

d. a first exclusive OR gate circuit means having a first and second input and for producing a first DC signal in its one output state and a second DC signal in its other output state;

e. the output of said first exclusive OR gate circuit means being connected to operate said AC control means;

f. a first manually operable switch electrically connected to control the first input of said first exclusive OR gate circuit means so that operation of said switch will change the state of energization of said electrical load; and

g. means for readily connecting a second manually operable switch in a manner such that any operation of the second switch would change the state of said second input of said first exclusive OR gate circuit means.

4,011,483

GROUND WIRE MONITORING SYSTEM

Samuel K. Meadows, Piney View, W. Va., assignor to The Ohio Brass Company, Mansfield, Ohio

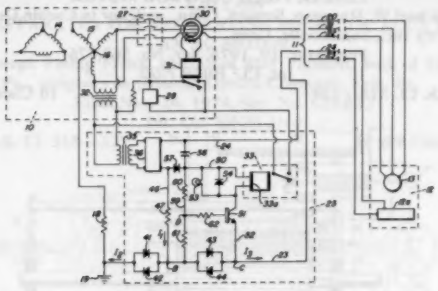
Filed Nov. 7, 1974, Ser. No. 521,682

Int. Cl.² H02H *3/16, 1/02*

U.S. Cl. 361—47 **5 Claims**

1. A ground wire monitoring circuit for a polyphase current power system comprising a power source having a transformer providing a system neutral point, a ground for the system to which said neutral point is connected, a ground fault current limiting resistor interposed between the neutral point and the system ground, phase conductors to transmit power to an electric power consuming apparatus having a frame, a ground

wire extending from the frame of the apparatus to the power source and connected to the system ground, and a main circuit breaker for said phase conductors, said monitoring circuit comprising a pilot wire extending from the frame of the apparatus, a low voltage D.C. source at the power source for supplying a circulating current to said ground and pilot wires, one terminal of said D.C. source being connected to said pilot wire, circuit means for dividing said circulating current into a first part flowing through the ground wire to the machine



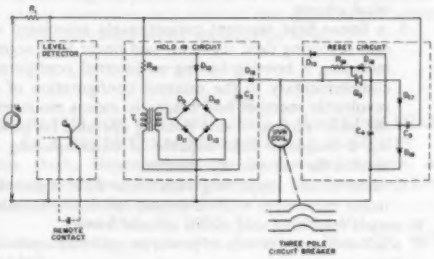
frame and returning to the D.C. source through the pilot wire and a second part flowing through a segment of the ground wire to the system ground, then through any stray parallel ground paths that may be present to the machine frame and through the pilot wire to the D.C. source, and switching means responsive only to the first part of said circulating current and independent of any current that may flow through said stray paths for opening the system circuit breaker upon cessation of flow of said first part of said current.

4,011,484

UNDERVOLTAGE RELEASE WITH ELECTRICAL RESET FOR CIRCUIT BREAKER

Derek A. Paice, Murrysville, and Alan B. Shimp, Monroeville, both of Pa., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Feb. 23, 1976, Ser. No. 660,192
Int. Cl.² H02H *3/06, 3/24*
U.S. Cl. 361—59 **7 Claims**



1. An undervoltage reset and hold-in circuit for an alternating current power supply comprising in combination:

circuit detecting means for sensing when the alternating current voltage supply level falls below a preset level;

undervoltage coil circuit means operatively connected to said detector means to trip a circuit breaker when said detecting means is activated by the supply voltage dropping below the preset level;

a reset circuit connected to said coil and supply voltage to reset said undervoltage coil means and its associated circuit breaker by applying a repetitive pulse thereto when above the preset level;

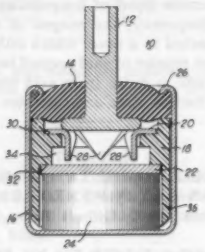
a hold-in circuit operatively connected to said coil and circuits to insure that said coil means is held in an operature condition after being reset by applying a continuous signal thereto.

4,011,485

VALVE TYPE SURGE ARRESTER

Francis V. Cunningham, Western Springs, Ill., assignor to Joslyn Mfg. and Supply Co., Chicago, Ill.

Filed May 30, 1975, Ser. No. 582,136
Int. Cl.² H02H *9/06*
U.S. Cl. 361—127 **6 Claims**



1. A surged arrester comprising,

a conductive arrester outer housing,

a power follow current limiting valve block disposed entirely within said housing and conductively connected to said housing through a low electrical resistance path,

first spark gap electrode means disposed within said housing,

means for electrically connecting said first electrode means to an electrical power source,

second spark gap electrode means electrically disposed within said housing, spaced from said first electrode means to form a spark gap and connected through a low electrical resistance path to said valve block and

an insulating spacer disposed entirely within said housing including first integrally formed means for positioning said first electrode means within and spaced from said housing to thereby electrically insulate said first electrode means from an adjacent portion of the inner surface of said housing, second integrally formed means for positioning said second electrode means within and spaced from said housing to thereby electrically insulate said second electrode means from an adjacent portion of the inner surface of said housing, third integrally formed means for forming a relatively long electrical creep path between said first and second electrode means and fourth integrally formed means for electrically insulating a portion of the outer periphery of said valve block from adjacent portions of the inner surface of said housing.

4,011,486

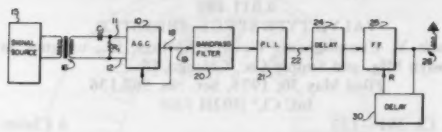
TONE OPERATED SWITCHING ARRANGEMENT

David B. Oulton, Dollard des Ormeaux, Canada, assignor to Pylon Electronic Development Company Ltd., Lachine, Canada

Filed Mar. 27, 1975, Ser. No. 562,804
Int. Cl.² H01H *47/20*
U.S. Cl. 361—182 **6 Claims**

1. A switching arrangement operable by a tone of a predetermined frequency comprising an automatic gain control amplifier having a signal input, a control input and an output, the signal input being connectable to a source of signals and the output being connected to an input of a bandpass filter which rejects all frequencies except those of a narrow band centered on said predetermined frequency, said output also being connected to said control input whereby the sensitivity

of the automatic gain control amplifier is adjusted to be a maximum for the largest amplitude frequency appearing at said signal input, said bandpass filter being connected to an input of a phase locked loop which produces a change in voltage from a first level to a second level at its output only in



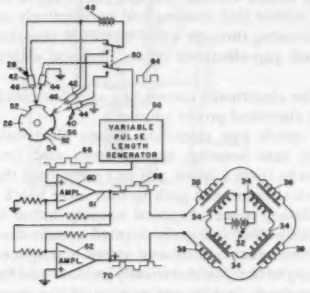
response to a narrow band of frequencies centered on said predetermined frequency, the output of said phase locked loop being connected to a timer which only produces a pulse at its output upon receipt of said second level of voltage for a predetermined time, a pulse from said timer being fed to a flip-flop which changes state and operates a relay.

4,011,487

SOLID STATE COMMUTATOR MOTOR WITH INTERNALLY POWERED ARMATURE

Donald D. Loomis, 5402 Gilbert Drive, San Diego, Calif. 92115

Filed Oct. 7, 1974, Ser. No. 512,469
Int. Cl.² H02K *29/00*
U.S. Cl. 318—138 **8 Claims**



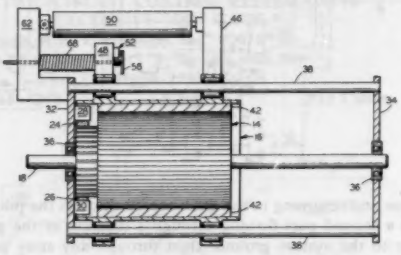
1. An electric motor comprising:
a rotor body mounted for rotation on a shaft,
at least one armature electro-magnet carried by said rotor body,
at least one DC battery mounted within said rotor body and connected to power said armature electro-magnet to produce a fixed magnetic pole for each of said armature electro-magnets,
at least one field electro-magnet mounted in juxtaposition to the circular path of said armature electro-magnet,
a source of DC power for said electro-magnet,
an encoding disc on said shaft, said encoding disc having a number of encoding segments equal to twice the number of said armature electro-magnets,
sensor means in association with said encoding disc for detecting the passage of alternate segments of said disc and producing a signal output corresponding to a detection of said alternate segments,
said sensor means comprising a first sensor for detecting the passage of alternate segments of said encoding disc and mounted to fixed structure at a first position with respect to said encoding disc,
a second sensor for detecting the passage of alternate segments of said disc mounted to fixed structure at a second position rotationally displaced around said encoding disc with respect to said first position,
amplifier means connected between said sensor means and said field electro-magnet for increasing the power of pulses corresponding to signals produced by said sensor means in detecting said segments,
a forward-reverse switch for selectively connecting said first sensor or said second sensor to said power delivery means.

4,011,488

LINEAR FIELD CONTROL MOTOR

Michael W. Hanagan, Somers, Conn., assignor to Corbin Gentry Inc., Somersville, Conn.

Filed Mar. 19, 1975, Ser. No. 560,176
Int. Cl.² H02P *7/00*
U.S. Cl. 318—139 **10 Claims**



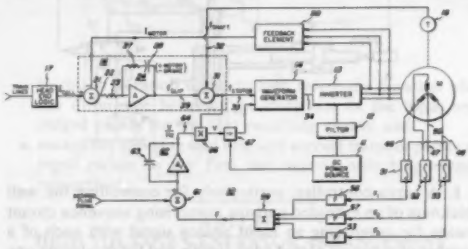
1. In combination with a motor vehicle having a frame, a seat for a driver and a plurality of wheels, the combination therewith of
A. a linear field control motor comprising:
1. an output shaft operatively connected to at least one of said wheels of said motor vehicle for imparting drive thereto;
2. support means operable for supporting the ends of said output shaft for rotation relative thereto;
3. a revolving field segment including a revolvable member mounted on said output shaft intermediate the ends thereof for rotation therewith;
4. electrical conductor means supported in the linear field control motor in operative engagement with said revolvable member, said electrical conductor means being operable to connect the linear field control motor in electrical circuit relation in an external electrical circuit;
5. a linear field segment cooperatively associated with said revolving field segment, said linear field segment including a housing having an internal configuration complementary to the external configuration of said revolvable member and magnetic means mounted on the inner surface of said housing operable for producing a magnetic field capable of emcompassing said revolvable member therewithin;
6. slide means supporting said linear field segment for linear movement relative to said revolvable member;
B. means mounting said motor on said frame;
C. a self-contained source of power on said frame providing direct current;
D. circuit means between said power source and said motor; and
E. actuator means operatively connected to said linear field segment for imparting movement thereto, said actuator means having at least a portion thereof accessible externally of said motor adjacent said driver seat, said actuator means being operable when actuated to cause said linear field segment to move relative to said revolvable member between a first position wherein said linear field segment is located in nonsurrounding relation to said revolvable member corresponding to the operating condition of the linear field control motor wherein the minimum horsepower is produced thereby and a second position wherein

said linear field control motor encircles said revolvable member corresponding to the operating condition of the linear field control motor wherein the maximum horsepower is produced thereby, said actuator means including throttle means comprising in part said externally accessible portion and support means on said frame for said throttle means.

4,011,489
APPARATUS FOR REGULATING MAGNETIC FLUX IN AN AC MOTOR

Joseph Phillip Franz, and Allan Barr Plunkett, both of Erie, Pa., assignors to General Electric Company, Erie, Pa.

Filed Nov. 20, 1974, Ser. No. 525,613
Int. Cl.² H02D *5/40*
U.S. Cl. 318—227 **29 Claims**



1. An improved flux regulation system for an a-c motor having a stator and a rotor spaced from one another by an air gap, said stator including a plurality of teeth defined by slots in a surface of the stator adjacent to said air gap and a winding comprising a plurality of main coils embedded in said slots, the stator winding being adapted to be excited by a controllable source of electric power so as to produce electromagnetic flux across the air gap between the stator and the rotor, wherein the improvement comprises:

a. a sensing coil placed around at least one of said teeth of the motor stator so as to have induced therein a voltage signal substantially proportional to the rate of change of flux across the air gap;

b. means for integrating said voltage signal to obtain a signal representative of said flux; and

c. means responsive to said representative flux signal for controlling the power source so as to vary a parameter of stator excitation in a manner that maintains a substantially controlled motor air gap flux level.

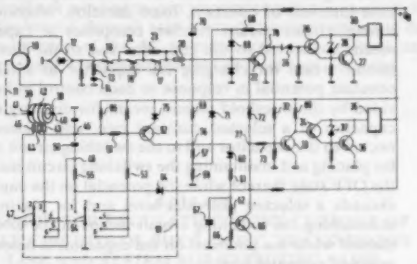
4,011,490
APPARATUS FOR IMMOBILIZING A WORKING SHAFT AT A PREDETERMINED ANGULAR POSITION

Heinz Daab, Heppelstrasse 46, Darmstadt-Arheilgen, and Bernd Scheider, Ostpreussenstrasse 25, Darmstadt-Eberstadt, both of Germany (6100)

Filed Mar. 26, 1975, Ser. No. 562,104
Claims priority, application Germany, Mar. 29, 1974, 2415359
Int. Cl.² G05B *5/01*
U.S. Cl. 318—269 **13 Claims**

1. Apparatus for immobilizing a shaft at a predetermined angular position, comprising an electric clutch motor whereof the clutch element transmissively coupled to the working shaft may be connected to a continuously driven main driving spindle of the clutch motor and/or to a braking member by the action of regulator operatively controlled by the difference between the actual speed of revolution and a predetermined nominal speed of revolution, to drive the working shaft substantially at a predetermined working speed of revolution, wherein the improvement comprises:

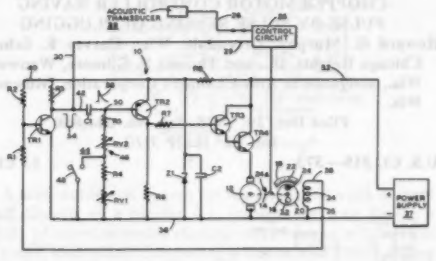
said regulator having a regeneratively coupled control amplifier having means connected between the input and output thereof for generating a variable degree of negative feedback, and means for adjusting said feedback to a minimum value for the final braking action.



4,011,491
MOTOR SPEED CONTROL CIRCUIT

Lawrence L. Grover, Saint Joseph, and David L. Plangger, Buchanan, both of Mich., assignors to Heath Company, Benton Harbor, Mich.

Continuation of Ser. No. 452,691, March 19, 1974, which is a continuation of Ser. No. 288,216, Sept. 11, 1972, abandoned. This application Mar. 21, 1975, Ser. No. 560,944
Int. Cl.² H02P *5/00*
U.S. Cl. 318—327 **5 Claims**



1. A speed-controlling circuit for controlling the rotational speed of a D.C. motor by selectively connecting the motor to a power supply circuit and disconnecting the motor from the power supply circuit, said speed-controlling circuit comprising:

switching circuit means for controlling the supply of electric current to the motor, said switching circuit means being connected to the power supply and to the motor and having an ON state causing the motor to be connected across the power supply circuit and an OFF state causing the motor to be disconnected from the power supply circuit;

transducer means coupled with the motor and responsive to the rotational speed thereof to produce an electric pulse for each motor revolution, the magnitude of said electric pulses increasing with increased motor speed;

threshold circuit means connected to the transducer means to receive therefrom said electric pulses and including means for providing a threshold electric level, means for comparing the magnitude of each received electric pulse with said threshold electric level and means for providing a control pulse in response to each electric pulse whose magnitude exceeds the threshold electric level; and

timing circuit means connected to the threshold means to receive said control pulses therefrom and responsive to each received control pulse to place the switching circuit means in the OFF state thereof for a time interval of

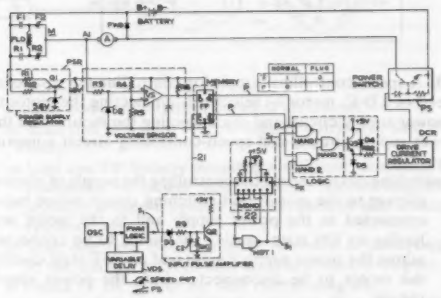
constant, fixed duration which is less than the duration of a motor revolution, said timing circuit maintaining the switching circuit means in the ON state except during said time intervals of constant, fixed duration, wherein said timing circuit means further comprises a capacitor, means connected to the capacitor and to the threshold circuit means for charging the capacitor to a selected constant potential in response to each control pulse provided by the threshold means, means for discharging the capacitor at a selected constant rate; and means connected to the capacitor and to the switching circuit means for placing and maintaining the switching circuit means in the OFF state thereof while the potential on the capacitor exceeds a selected potential level and for placing and maintaining the switching circuit means in the ON state thereof while the potential on the capacitor is below said selected potential level;

whereby current is at first supplied to the motor without interruption until the motor attains a selected speed at which the electric pulses from the transducer means exceed the selected threshold level, and then the supply of current to the motor is shut off for a constant, fixed time interval during each revolution of the motor, but said constant, fixed intervals occur at a rate proportional to the motor speed, to thereby quickly reach and then maintain a selected operational revolution speed.

4,011,492
CHOPPER MOTOR CONTROLLER HAVING PULSE-BY-PULSE SENSING OF PLUGGING

Howard G. Murphy, Greendale, Wis.; Harvey E. Schmidt, Chicago Heights, Ill., and Thomas P. Gilmore, Wauwatosa, Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 29, 1975, Ser. No. 644,880
Int. Cl.² H02P *3/10*
U.S. Cl. 318—373 **13 Claims**



1. In combination with a reversible D.C. traction motor connected in series with a semiconductor power switch and having means for generating a train of enabling pulses for turning said power switch on and off to regulate the speed of said motor, motor plugging means comprising

voltage sensor means for monitoring the voltage across the armature of said motor and when actuated, deriving a plugging signal if said voltage is below a predetermined value,

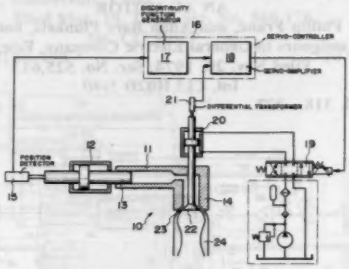
means responsive to each said enabling pulse to actuate said voltage sensor means and to also generate a short time duration pulse, and

logic means for respectively coupling said enabling pulses and said short time duration pulses to said power switch when said plugging signal is absent and when it is present.

4,011,493
SERVO-CONTROLLER

Hisahiko Fukase, and Minoru Yoneda, both of Yokohama, Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki-Kaisha and Kayabakogyo Kabushiki-Kaisha, both of Tokyo, Japan

Filed Dec. 2, 1974, Ser. No. 528,950
Claims priority, application Japan, Dec. 3, 1973, 48-135858
Int. Cl.² B29D *23/04*
U.S. Cl. 318—568 **5 Claims**



1. A servo-controller, particularly for controlling the wall thickness of an extruded parison, comprising sequence circuit means for comparing an input analog signal with each of a number of stepwise-sorted level signals and for producing one or more comparison signals in dependence upon the state of said analog signal;

a number of relay circuits arranged in correspondence with each of said level signals so as to respond to said comparison signals produced by said sequence circuit means;

a pin board connection panel having first and second switch group means operative for affecting the output and responsive to successive operations of said relay circuits, said first switch group means producing a set signal and said second switch group means including a plurality of switches each serving to operate switches which always operate the next step to each corresponding switch of said first switch group means; and settable discontinuity function generating circuit means comprising logic circuit means for subtracting said set signal obtained through said first switch group means from the signal obtained through said second switch group means, thereupon subtracting said analog input signal from the respective level signal, multiplying the thus obtained subtraction results and adding said set signal through said first switch group means to the multiplicand, so that the output of said discontinuity function generating circuit means forms a signal which serves as the input for a servo-amplifier.

4,011,494
INVERTER WITH SYMMETRY CORRECTION CIRCUITS

Mehmet Saka, Stevenage, England, assignor to International Computers Limited, London, England

Filed Sept. 4, 1975, Ser. No. 610,451
Claims priority, application United Kingdom, Sept. 21, 1974, 41200/74
Int. Cl.² H02M *3/335*
U.S. Cl. 321—12 **8 Claims**

1. An inverter switching circuit comprising:

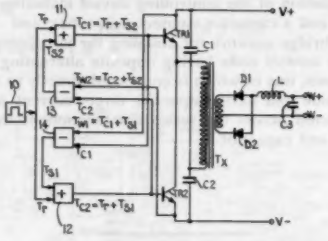
a. output transformer means;

b. first and second switching means connected in push-pull configuration to said output transformer means each switching means being switchable, in response to an input pulse, from a non-conducting state to a conducting state for the duration of an output pulse;

c. means for sensing the difference between the durations of the input and output pulses for each switching means;

d. means responsive to the sensing means, for generating

first and second trains of pulses, the pulses of the first train being timed to occur between the pulses of the second train, the pulses of the first train having a duration equal to a reference duration plus the difference between the durations of the input and output pulses for the second switching means, and the pulses of the second train



having a duration equal to said reference duration plus the difference between the durations of the input and output pulses for the first switching means; and

e. means for applying said first and second trains of pulses as input pulses to the first and second switching means respectively.

4,011,495

HIGH VOLTAGE GENERATOR ARRANGEMENT

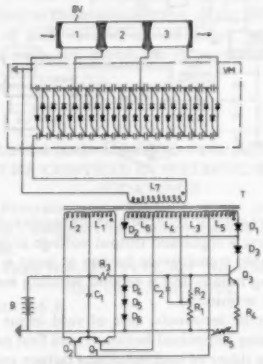
Frits Rooij, Rozenburg, Netherlands, assignor to N. V Optische Industrie "De Oude Delft", Netherlands

Filed July 2, 1975, Ser. No. 592,467

Claims priority, application Netherlands, July 9, 1974, 7409242

Int. Cl.² H02M 7/537

U.S. Cl. 321—18 **2 Claims**



1. In a high voltage generator arrangement particularly adapted for use with an image intensifier, the arrangement including transistor oscillator means which includes a transformer for supplying A.C. voltage and having a feedback winding for applying base current to said transistor oscillator means and an output winding, a voltage multiplier connected to said output winding, and circuit means responsive to the load on said arrangement for controlling power supplied by said arrangement, the improvement in said control circuit means comprising:

auxiliary winding means on said transformer connected in series with said feedback winding;

a control transistor connected as a current source within said circuit means;

diode means for connecting the collector-emitter circuit of said control transistor to said auxiliary winding means; and

means including said auxiliary winding means for establishing a base potential for said control transistor to cause portions of the direct base current applied from said feedback winding to said transistor oscillator means to be discharged through said control transistor whenever the magnitude of the AC voltage across said feedback and auxiliary winding means exceeds said base potential.

4,011,496

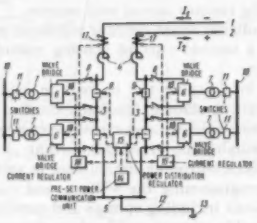
METHOD FOR REGULATING WORK CURRENT OF HALF CIRCUITS OF BIPOLAR D.C. TRANSMISSION LINE AND SYSTEM FOR EFFECTING SAME

Khaim Shlemovich Grois, Lesnoi prospekt, 15, kv. 38; Vladislav Alexandrovich Kapustin, Grazhdansky prospekt, 85, kv. 141; Vladislav Alexeevich Merzheevsky, ulitsa Nekrasova, 60, kv. 125, all of Leningrad; Anatoly Mikhailovich Monastyrsky, ulitsa Pushkina, 14, kv. 53, Volgograd; Igor Nikolaevich Shaposhnikov, Chongarsky bulvar, 13, kv. 53, Moscow, and German Vasilievich Karasev, prospekt Engelsa, 40, kv. 20, Leningrad, all of U.S.S.R.

Filed July 24, 1975, Ser. No. 598,985

Int. Cl.² H02P 13/16

U.S. Cl. 321—27 R **2 Claims**

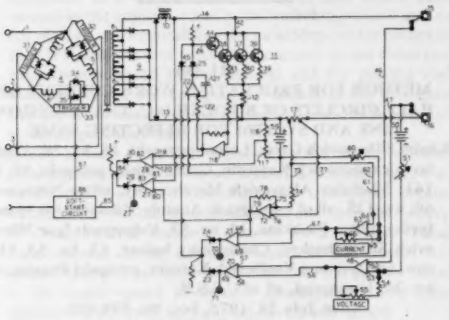


2. A semi-automatic system for regulating the work current in half circuits of a bipolar d.c. transmission line having a plurality of interconnected electric valve bridges with control electrodes, said system comprising a transmitted power setting unit having first and second outputs, means for calculating half circuit current regulator settings having a first input connected to a first output of said transmitted power setting unit, means for converting half circuit current regulator settings having an input connected to an output of said means for calculating half circuit current regulator settings, means for setting an operating connection pattern of the electric valve bridges, a power zone finder for finding a zone wherein there is a definite and constant connection sequence of said electric valve bridges for minimizing the sum of transmitted power loss components, an optimum detector for determining the connection pattern codes of said electric valve bridges, beginning with the optimum connection pattern in the given power zone, a selecting matrix for selecting an operating connection pattern of said electric valve bridges, and a limitation setting unit for generating signals for limiting the number of said electric valve bridges put into operation and the current magnitude in each said half circuit, the second output of said power setting unit being connected to an input of said power zone finder whose output is connected to an input of said optimum detector whose output is connected to a first input of said selecting matrix a first output of which is connected to an input of said means for setting the operating connection pattern of said electric valve bridges, a second input of said selecting matrix being connected to an output of said limitation setting means, whereas a second output of said selecting matrix is connected to a second input of said means for calculating half circuit current regulator settings.

4,011,497
VOLTAGE/CURRENT REGULATED POWER SUPPLY FOR VERY HIGH OUTPUT CURRENTS

Sarkis Nercessian, Flushing, N.Y., assignor to Forbro Design Corporation, New York, N.Y.

Continuation of Ser. No. 379,418, July 16, 1973, abandoned. This application Dec. 10, 1975, Ser. No. 639,451
Int. Cl.² G05F 1/50, 1/58, 1/60
U.S. Cl. 323—4 **2 Claims**

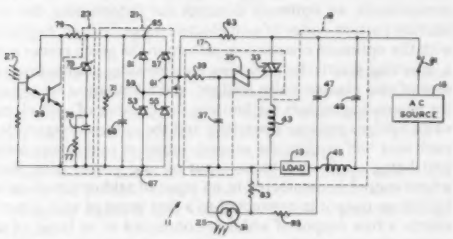


1. In a regulated DC power supply, the combination of;
a controllable source of DC current;
a pair of load terminals connected through a first current sensing resistor across said source;
a controllable shunt current stabilizer connected in series with a second current sensing resistor and across said source;
means for keeping the current in said current stabilizer constant including feedback control means connected between said second current sensing resistor and said controllable source of DC current;
means for controlling the current in said current stabilizer for programming the voltage and current to said load terminals including voltage and current feedback means, adjustable current and voltage reference voltage means and current and voltage control amplifier means;
and including means for limiting the current in said shunt current stabilizer and a time delay means for delaying the limiting action of said last said means for a predetermined time interval.

4,011,498
CONTROLLING CIRCUIT

David C. Hamstra, Clinton, Iowa, assignor to General Electric Company, Fort Wayne, Ind.

Filed June 26, 1975, Ser. No. 590,504
Int. Cl.² G05F 1/44
U.S. Cl. 323—21 **10 Claims**

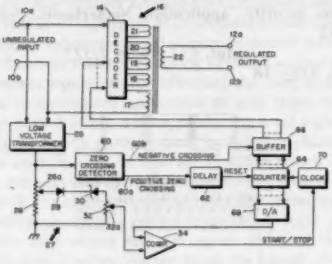


1. A circuit for controlling the application of power from a source thereof to a load comprising:
a phase control circuit for supplying current from the source to the load and having a voltage responsive control node;
means responsive to an effective voltage applied to the load for varying the voltage applied to the control node to maintain the effective voltage to the load near a preferred value despite variations in the voltage of the source;
initializing circuit means coupled to the control node for limiting the initial node voltage thereby preventing the application of excessive voltage to the load upon initial energization of the controlling circuit including a zener diode and a capacitor connected in series; and
a diode bridge network for coupling the initializing circuit to the control node having opposite alternating current junctions, one of which is connected directly to the control node and having opposite direct current junctions connected across the series combination of the zener diode and capacitor.

4,011,499
LOW LOSS A.C. VOLTAGE REGULATOR

Harry E. Betsill; Charles J. Levin, and Guilfred L. Vogt, all of Baltimore, Md., assignors to The Bendix Corporation, Southfield, Mich.

Filed Feb. 11, 1976, Ser. No. 657,339
Int. Cl.² G05F 1/16
U.S. Cl. 323—43.5 S **6 Claims**

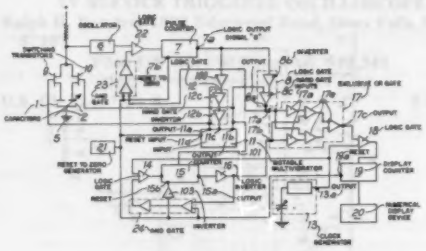


1. A voltage regulator receiving an unregulated input voltage and providing a regulated output voltage comprising:
a programmable transformer having at least a plurality of first winding means and a second winding means;
a first pair of terminals;
a second pair of terminals, one of said input and output voltages being impressed between said first pair of terminals and the other of said input and output voltages being impressed across said second pair of terminals;
means for detecting zero crossings of said input voltage;
a source of clock pulses;
means for counting clock pulses applied thereto;
a digital-to-analog converter for generating a voltage level correlated to the count in said means for counting, said count being correlated to a number;
means comparing said voltage level with the instantaneous level of said input voltage to apply clock pulses from said source to said means for counting, said means for counting being reset to an initial count upon a first zero crossing of said input voltage; and,
means responsive to said number for selectively connecting various of said first winding means between one of said first and second pairs of terminals, the winding means so connected being selected in accordance with said number, said second winding means being connected between the other pair of terminals.

4,011,500
PHYSICAL DISPLACEMENT SENSING WITH DIFFERENTIAL CAPACITOR

Claude Pelletier, Annecy, and Roger Velte, Annecy-le-Vieux, both of France, assignors to Societe Nouvelle de Roulements, France

Filed Dec. 16, 1974, Ser. No. 533,231
Claims priority, application France, Dec. 18, 1973, 73.45271
Int. Cl.² G01R 27/26
U.S. Cl. 324—61 R **14 Claims**

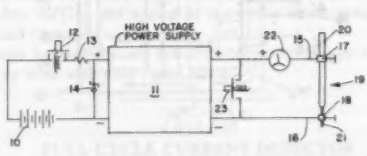


1. An apparatus for measuring a parameter comprising first and second electrical elements which have respective electrical characteristics that vary by substantially the same amount but in opposite senses in response to a variation in the value of said parameter; first pulse generator means operable to produce a first pulse having a length proportional to the value of the electrical characteristic of said first element; second pulse generator means operable to produce a second pulse having a length proportional to the value of the electrical characteristic of said second element; and signal processing means connected to said first and second pulse generator means and responsive thereto to produce a third pulse having a length corresponding to the absolute value of the difference between the lengths of said first and second pulses, whereby the length of said third pulse represents the value of the parameter measured.

4,011,501
APPARATUS AND METHOD FOR DETERMINING MOISTURE CONTENT IN WELDING ELECTRODE COATINGS

Marvin L. Peterson, and Charles F. Cole, Jr., both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Nov. 21, 1975, Ser. No. 634,093
Int. Cl.² G01R 27/02
U.S. Cl. 324—65 R **3 Claims**



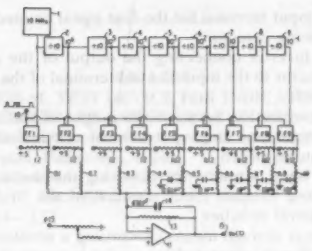
1. A method for non-destructively determining the moisture content of the coating portion of a low hydrogen electric arc steel welding electrode having a non-conductive inorganic coating comprising:

a. providing a low-voltage source of direct current;
b. transforming the output of the low-voltage source of direct current to a high voltage direct current source;
c. providing a circuit whereby said high voltage supplies electrical potential between two electrical contact means, said circuit including an electrical current indicating means for indicating the amount of electrical current flowing through said circuit;
d. connecting one of said electrical contact means to said electrode;
e. connecting the other of said electrical contact means to the inorganic coating portion of said electrode;
f. completing said circuit whereby said high voltage is applied between said two electrical contact means; and
g. determining the moisture content of said coating portion by reference to the output of said electrical current indicating means.

4,011,502
LOGARITHMIC RATEMETER WITH BISTABLE SIGNAL COMPARISON

Herbert James Fraser, Bulli, Australia, assignor to Australian Atomic Energy Commission, Coogee, Australia

Filed Mar. 7, 1975, Ser. No. 556,541
Claims priority, application Australia, Mar. 27, 1974, 7047/74
Int. Cl.² G01R 23/02
U.S. Cl. 324—78 E **9 Claims**



1. In a ratemeter apparatus having means for processing a pulsed random input signal to provide an output which is logarithmic indication of the pulse rate of the random input signal, the improvement comprising:

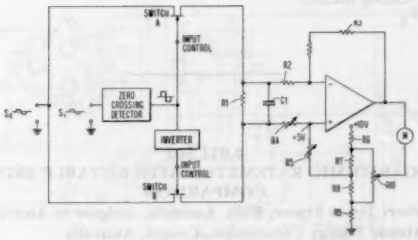
i. the processing means having a plurality of bistable devices with respective first and second stable states;
ii. first and second inputs to each bistable device, each said first input being adapted to receive said pulsed input signal;
iii. means for supplying second pulsed signals to said second inputs of said bistable devices, each said second pulsed signal being different from but maintained in substantially constant frequency relation with each other second pulsed signal;
iv. each said bistable device having automatic switching means responsive to a pulse received at said first or second input respectively, if and only if said bistable device is in said second or first stage respectively, to switch said bistable device from said second or first state to said first or second state respectively;
v. each said bistable device having output means for providing a characteristic output signal indicative of the state in which the bistable device is residing;
vi. and operating means
  a. for receiving said output signals,
  b. for determining the proportion of time during which each output signal characterizes a selected one of said states, and
  c. for providing an operating output corresponding to the summation of the proportions of time so determined for said plurality of bistable device.

4,011,503

APPARATUS FOR MEASURING THE PHASE RELATION OF TWO ALTERNATING CURRENT SIGNALS

John M. Ferrara, Yardley, Pa., assignor to Narco Scientific Industries, Inc., Fort Washington, Pa.

Filed Oct. 16, 1975, Ser. No. 622,842
Int. Cl.² H03D *13/00*; **G01R** *25/00*
U.S. Cl. 324—83 R **1 Claim**



1. A circuit for measuring the difference in phase between first and second alternating signals of the same frequency comprising:

a. first and second bilateral switches each having an input control terminal, an input terminal, and an output terminal;

b. an input terminal for the first signal connected to a zero crossing detector;

c. an inverter connecting the output of the zero crossing detector to the input control terminal of the first bilateral switch;

d. a connection between the output of the zero crossing detector and the input control terminal of the second bilateral switch;

e. an input terminal for receiving the second signal connected to each input terminal of the first and second bilateral switches;

f. charge storage means comprising a resistance and a capacitance connected in parallel between the two output terminals of the bilateral switches whereby the net average charge resulting from the application of said first and second signals to the circuit is stored as an indication of the phase relationship of said first and second signals;

g. an operational amplifier connected to said charge storage means adapted to provide an output signal proportional to the charge contained in said storage means, wherein variable resistances (R_4 and R_5) are connected to an input terminal of the operational amplifier to allow the circuit to be adjusted so that a bias level DC voltage in the measured signal will not produce a phase measurement error;

h. meter means operatively connected to the output of the operational amplifier to provide an indication of the phase relationship of the two signals.

4,011,504

SOLID STATE SCALE EXPANDING CIRCUIT FOR ELECTRICAL INDICATOR DEVICES

Lawrence V. DePillo, 11 Steuben St., Waterbury, Conn. 06708

Filed June 12, 1975, Ser. No. 586,507
Int. Cl.² G01R *15/08*, *15/10*
U.S. Cl. 324—115 **15 Claims**

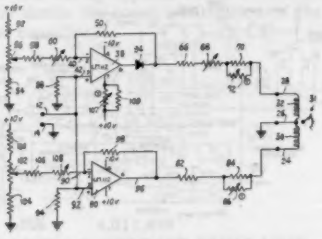
1. A circuit for use with an electrical indicating device to provide a scale-expanding or scale-compressing drive therefor, comprising in combination:

a. a pair of input terminals adapted to be connected to a source of input voltage which is to be measured and which varies over a predetermined input range,

b. output terminals for connection to the indicating device,

c. an electrical voltage responsive network interposed between one of said input terminals and one of said output terminals, said network normally providing, for the entire predetermined range of said input voltage, an incremental voltage contribution to said one output terminal in response to incremental input voltage excursions at the input terminals, and

d. amplifying means including biasing means therefor, said amplifying means being connected with said input terminals and responding to voltages impressed thereon to provide to one of said output terminals a voltage contribution having a given characteristic incremental value for incremental voltages over one portion of the predetermined input range and a different characteristic incremental value for incremental voltages over another portion of the predetermined input range whereby a complete voltage excursion at the output terminals will manifest zones of different incremental characteristics when an input voltage having an excursion of monotonous incremental characteristic is applied at the input terminals,



e. said amplifying means comprises a driving amplifier and a driven amplifier, connected in cascade,

f. said driven amplifier having a feedback network connected between its output and its input, and

g. an indicator having a field coil,

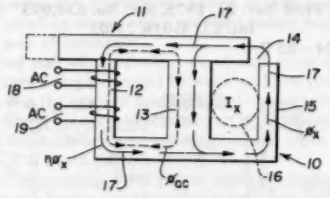
h. said field coil constituting part of said feedback network.

4,011,505

CURRENT MEASURING DEVICE

David I. Spalding, Epping, Australia, assignor to Applied Power Australia Limited, Canberra City, Australia

Filed Sept. 22, 1975, Ser. No. 616,166
Int. Cl.² G01R *15/02*, *33/00*
U.S. Cl. 324—117 R **8 Claims**



1. A current measuring device for measuring a current flowing in a conductor by inductive coupling to the conductor, said device comprising

an E-shaped core of magnetic material having first and second outer legs and a center leg spaced from said second outer leg sufficiently to provide a space therebetween for the reception of a conductor carrying the current to be measured,

a bar movably associated with said E-shaped core and movable between a first position in which the bar is displaced from the end of said second outer leg sufficiently to provide for the insertion of a conductor therein to a normal

position in which it is in engagement with said first outer leg and said center leg but is displaced from said second outer leg by an air gap,

a pair of windings disposed on said first outer leg,

means for alternately energizing said windings to cause flux flow in opposite directions,

and means for measuring any difference in voltage across said windings resulting from the effect of flux flowing in said center leg because of current flow in said conductor.

4,011,506

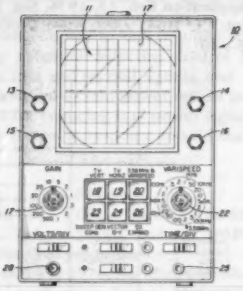
TV SERVICE TRIGGERED OSCILLOSCOPE

Ralph H. Bowden, 1800 Edgewood Road, Sioux Falls, S. Dak. 57107

Filed Feb. 12, 1975, Ser. No. 549,348

Int. Cl.² G01R *13/22*; **H04N** *9/02*

U.S. Cl. 324—121 R **8 Claims**



1. An oscilloscope for use in television servicing, comprising

an amplifier for amplifying a television signal,

sync separator means coupled to the output of said amplifier for separating the horizontal and vertical sync pulses therefrom,

said separator means having a first output at which said horizontal sync pulses appear and a second output at which said vertical sync pulses appear,

trigger pulse shaping means,

switch means for coupling the separated horizontal or vertical sync pulses to said trigger pulse shaping means or for coupling the output of said amplifier to said trigger pulse shaping means,

a ramp wave generator,

means coupling the output from said shaping means to said ramp generator to synchronize the ramp wave with the shaped pulses,

means operative only when the output of said amplifier is connected to said trigger pulse shaping means for adjustably varying the speed of the ramp wave generated by said ramp wave generator, and

means for driving one set of deflection plates in a cathode ray tube with said ramp wave.

4,011,507

FULL CYCLE CURRENT DETECTOR

Allen J. Rossell, Detroit, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Nov. 10, 1975, Ser. No. 630,621

Int. Cl.² G01R *19/16*, *31/02*

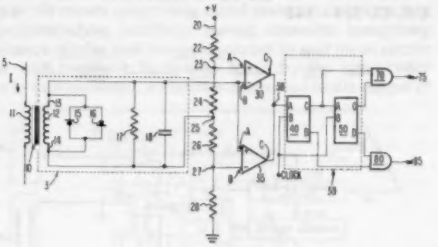
U.S. Cl. 324—127 **11 Claims**

1. A circuit for detecting current flowing in an external circuit and for generating discrete outputs responsive thereto the outputs respectively identifying current in the external circuit which is either (1) constant zero or constant direct current or (2) both non-zero and varying, said circuit comprising:

means for sensing current flowing in the external circuit and for generating a voltage in accordance with the magnitude of the current;

means for establishing a preselected threshold voltage range;

comparing means for generating first signals when said voltage is within said preselected voltage range and second signals when said voltage is outside said preselected voltage range; and



means associated with said comparing means for triggering a first output means in response to successive first signals and for triggering a second output means in response to successive second signals.

4,011,508

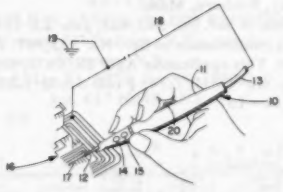
LOGIC SIGNAL TEST DEVICE FOR INDICATING LOW, INTERMEDIATE AND HIGH LEVEL SIGNALS

Robert J. Gabor, Mentor, Ohio, assignor to A & P Products Incorporated, Painesville, Ohio

Filed Mar. 24, 1975, Ser. No. 561,111

Int. Cl.² G01R *31/02*, *19/16*

U.S. Cl. 324—133 **14 Claims**



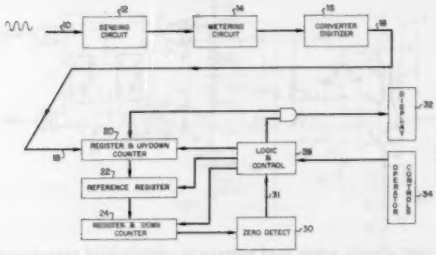
1. An electric signal testing device for indicating whether an electrical signal in a circuit being tested is at low, intermediate or high level comprising:

means for receiving such electrical signal; first and second indicator portions connected in parallel with each other and in series with said means for receiving and a relative ground connection, said first indicator portion comprising a first threshold indicator and an electric energy source having positive and negative sides and connected in electrical circuit relation with said first threshold indicator, and said second indicator portion comprising a second threshold indicator; said first and second threshold indicators having respective energized and de-energized states with a change of state occurring at respective threshold levels; whereby energization of said first threshold indicator indicates such electrical signal being at one of such low or high levels, energization of said second threshold indicator indicates such electrical signal being at the other one of such low or high levels, and such intermediate level being indicated by said first and second threshold indicators being in respective de-energized states.

4,011,509
APPARATUS FOR RELATIVE POWER MEASUREMENTS IN A POWER METER

Allen P. Edwards, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 14, 1975, Ser. No. 567,587
Int. Cl.² G01R 11/16
U.S. Cl. 324—142 **9 Claims**



1. In combination with a power meter of the type wherein an input sensing circuit, a metering circuit, and a digitizer are provided for producing a digital signal representing the power value of an input signal, the improvement which comprises:

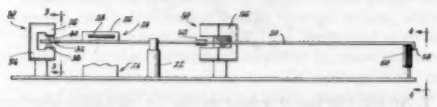
register means for storing a reference digital signal representing a reference power value; and

a digital circuit coupled to the register means and coupled to the digitizer for processing the digital signal with respect to the reference digital signal to provide an output signal representing the relative value of the digital signal with respect to the reference digital signal.

4,011,510
SIGNAL-RESPONSIVE APPARATUS HAVING MAGNETIC-PARTICLE-FRICTION MEMORY

Everett O. Olsen, Wrentham, Mass., assignor to The Foxboro Company, Foxboro, Mass.

Continuation of Ser. No. 543,443, Jan. 23, 1975, abandoned, which is a continuation of Ser. No. 333,997, Feb. 20, 1973, abandoned. This application Apr. 26, 1976, Ser. No. 680,134
Int. Cl.² G01R 1/14; F16D 37/02; G05B 5/01
U.S. Cl. 324—157 **26 Claims**



25. Signal-handling apparatus comprising, in combination:

a movable member mounted for movement in one direction or the reverse in response to a positioning force applied thereto in said one direction or the reverse;

magnetically-operated friction means coupled to said movable member and including means to develop a friction restraining force having a magnitude sufficient to hold said member firmly in place in the absence of the positioning force applied to said member but insufficient to prevent movement of said member in response to application of the positioning force, said friction means including a mass of magnetized particles engaging an element coupled to said movable member for continuously corresponding movement therewith to develop said friction force by said contact between said element and the particles, said particles being supported to provide for movement relative to one another and also to accommodate movement of said element relative to said particles as said element moves with said member, said particles and said movable member cooperatively providing a non-drift memory to hold and maintain the position of said member wherever it may be when said positioning force ceases, whichever direction the member had previously been moved by said force;

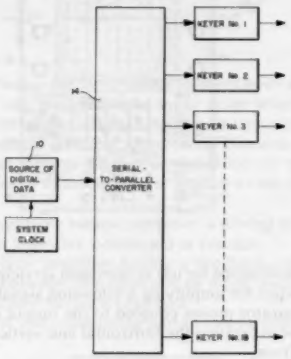
a transducer effectively coupled to said movable member and responsive to the position thereof for producing an output signal having a characteristic the magnitude of which represents the position of said movable member; and

means to transmit said output signal to a remote location.

4,011,511
FREQUENCY-SHIFT DIGITAL DATA LINK AND DIGITAL FREQUENCY DETECTION SYSTEM

Robert Wu-Lin Chang, Huntington, N.Y., assignor to The Singer Company, Binghamton, N.Y.

Continuation of Ser. No. 491,272, July 24, 1974, abandoned. This application Feb. 13, 1976, Ser. No. 657,785
Int. Cl.² H04J 1/00; H04L 7/00, 27/10
U.S. Cl. 325—40 **15 Claims**



14. In a frequency-shift digital data link in which mark/space digital data are transmitted over a plurality of different mark/space frequency channels to a receiver, a method for synchronizing the overall data link system, comprising the steps of:

transmitting synchronization signals over a plurality of frequency channels;

receiving said signals and evaluating them to determine which of said signals was least degraded during said transmission; and

selecting said synchronization signal least degraded during transmission and passing it on as a clock signal to be used throughout the receiver to synchronize the receiver with the transmitter in said data link system.

4,011,512
ELECTRICAL COMPONENT FAILURE DETECTION APPARATUS

David Michael Drury, Mundelein, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 21, 1975, Ser. No. 579,528
Int. Cl.² H03G 3/18
U.S. Cl. 325—150 **11 Claims**

1. An electrical component failure detection apparatus for use with radio frequency power generating equipment, comprising:

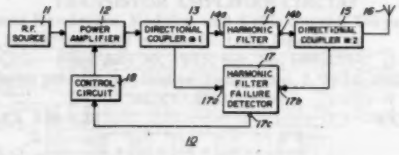
power means for generating power signals;

component means having an input terminal coupled to said power means and an output terminal, said component means receiving said power signals at said input terminal and developing corresponding output signals at said output terminal;

load means coupled to said component output terminal for receiving said output signals;

first means, including a first directional coupler coupled between said power means and said component means, for producing a first DC signal indicating the forward power delivered to said component means;

second means, including a second directional coupler coupled between said load means and said component



means, for producing a second DC signal indicating forward power delivered to said load means;

comparator means coupled to said first and second means for producing a failure detecting control signal in response to said first and second signals; and

control means coupled to said power means and said comparator means for reducing said power signals generated by said power means in response to said control signal.

4,011,513

TUNING DEVICE FOR A RADIO RECEIVER

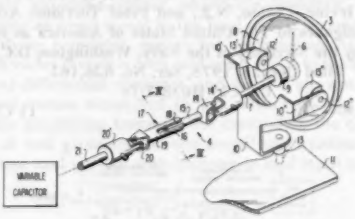
Manabu Kawachi, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Mar. 19, 1976, Ser. No. 668,382

Claims priority, application Japan, Mar. 20, 1975, 50-36646[U]; July 21, 1975, 50-100179[U]

Int. Cl.² H04B 1/06

U.S. Cl. 325—312 **7 Claims**



1. In a radio receiver having a body, a tuning element with a tuning shaft coupled thereto, and a manually controlled tuning dial having tuning indicating means associated therewith, the improvement comprising, means for pivotally attaching said tuning dial and tuning scale to said body to permit said dial and scale to be pivoted to face various selected directions, and rotational coupling means, including at least one universal coupling, connecting said dial to said tuning shaft to permit rotation of said dial to be transferred to said shaft regardless of the facing direction of said dial and scale.

4,011,514

MEMORY CIRCUIT FOR TUNING OF AN ELECTRONICALLY TUNED RECEIVER TO A PRESELECTED STATION

Jerzy Wróblewski, Warsaw, Poland, assignor to UNITECH Przedsiebiorstwo Techniczno-Hand-Lowe, Warsaw, Poland

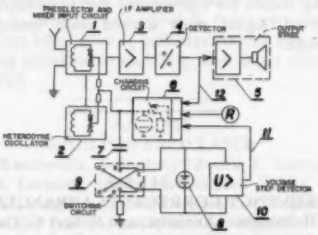
Filed Apr. 28, 1975, Ser. No. 572,443

Claims priority, application Poland, May 6, 1974, 170845

Int. Cl.² H04B 1/16

U.S. Cl. 325—464 **5 Claims**

1. An arrangement for storing a tuning voltage of preselected stations for receivers having electronic tuning with elements of variable reactance having elements comprising capacitance diodes and being dependent on the applied bias voltage, comprising in combination, input circuit means having elements comprising capacitance diodes, said input circuit means being tuned for reception of electrical signals at predetermined frequency by means of said capacitance diodes, said input circuit means comprising tuned resonant circuit means, a superheterodyne oscillator having elements comprising capacitance diodes and being connected to said input circuit means, said oscillator being also tuned by the capacitance diodes in said oscillator, a detector connected to the output of



said input circuit means, capacitor means connected to said input circuit means and said oscillator for storing the tuning voltage applied to said elements in said input circuit means and said oscillator, a charging circuit connected to said capacitor means and controlled from the output of said detector means, at least one electrochemical integrator connected in series with said capacitor means, switching means connected between said integrator and said capacitor means for reversing interconnections between said integrator and said capacitor means, a voltage step detector connected in parallel with said integrator, said charging circuit being controllable from said voltage step detector or from the output of said detector means after actuating said switching means.

4,011,515

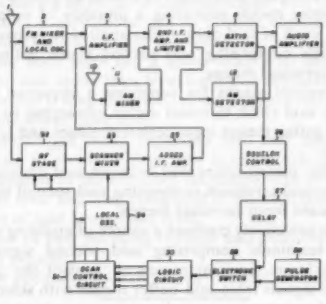
TUNABLE SCANNING RADIO RECEIVER

Raymond F. Hanson, Whitesboro, N.Y., assignor to General Electric Company, Syracuse, N.Y.

Filed May 23, 1975, Ser. No. 580,269

Int. Cl.² H04B 1/32

U.S. Cl. 325—470 **7 Claims**



1. A scanning radio receiver for automatically scanning a number of selected station frequencies within a given frequency band, comprising:

a. at least one voltage sensitive tunable element connected in the receiver circuit for tuning the receiver to said station frequencies as a function of a control voltage applied thereto,

b. scan control means for generating a plurality of discrete control voltages,

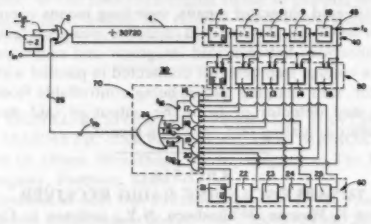
c. said scan control means including adjustable means for providing manual adjustment of said discrete control voltages over a range of values,
d. digital means for sequentially actuating said scan control means so as to provide at the output thereof an ordered sequence of said discrete control voltages,
e. first means for applying the output of said scan control means to said tunable element, and
f. second means for controlling said digital means as a function of the received signal so as to operate said digital means for providing scan tuning of said selected station frequencies when the received signal does not exceed a minimum signal strength and to inhibit operation of said digital means for interrupting said scan tuning when the received signal does exceed said minimum signal strength.

4,011,516

FREQUENCY CORRECTION ARRANGEMENT

Gary L. Heimbigner, Anaheim, and Robert G. Carlson, Costa Mesa, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 3, 1975, Ser. No. 628,294
Int. Cl.² H03B *19/00*
U.S. Cl. 328—14 **13 Claims**



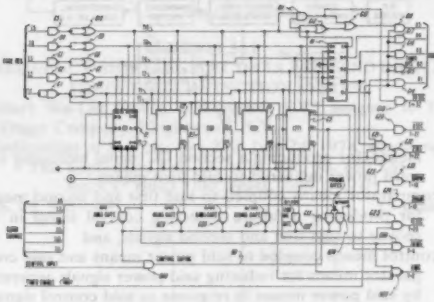
1. In combination:
first and second signal gating means having input and output terminal means, said first signal gating means output terminal means connected to a counter means,
said counter means providing a plurality of output pulse trains, each of said pulse trains applied to respective first terminals comprising said second signal gating means input terminal means,
clock terminal means for supplying a sequence of clock pulses, said clock terminal means connected to said first signal gating means input terminal means and to a buffer means,
said buffer means connected between said counter means and second terminals comprising said second signal gating means input terminal means,
means to selectively connect a source of enabling signals to third terminals comprising said second signal gating means input terminal means to control the gating of output signals from said buffer means with selected ones of said counter means pulse trains so as to thereby provide a correction signal,
output signals from said buffer means controlling the pulse duration of said gated correction signal with respect to the pulse duration of said sequence of clock pulses so that there is no pulse overlap therebetween, and
feedback means connected between said second signal gating means output terminal means and said first signal gating means input terminal means so that said correction signal is fed back and gated with said sequence of clock pulses.

4,011,517

TIMER APPARATUS FOR INCREMENTING TIMING CODE AT VARIABLE CLOCK RATES

Uwe A. Pommerening, Webster, and Glenn L. Richards, Caledonia, both of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Jan. 22, 1975, Ser. No. 542,947
Int. Cl.² H03K *1/17, 13/00;* **G01R** *29/02;* **H03K** *5/00*
U.S. Cl. 328—130 **9 Claims**



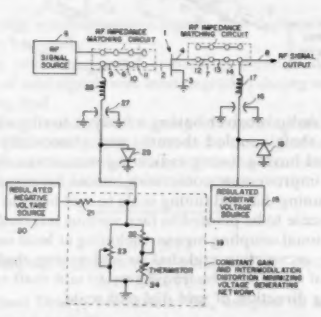
1. A timer apparatus comprising:
first means for receiving a first signal representative of a prescribed timing code; and
second means, coupled to said first means, for incrementing said timing code to produce a second signal representative thereof in accordance with a predetermined clock rate, the instantaneous frequency of which clock rate is determined by the time code value represented by said first signal.

4,011,518

MICROWAVE GaAs FET AMPLIFIER CIRCUIT

James A. Irvine, Clifton, N.J., and Peter Torrione, Astoria, N.Y., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

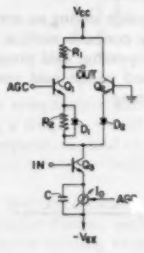
Filed Oct. 28, 1975, Ser. No. 626,162
Int. Cl.² H03F *3/16*
U.S. Cl. 330—23 **11 Claims**



1. A microwave field effect transistor (FET) amplifier circuit to provide a constant gain for said FET with varying temperature and to minimize intermodulation distortion of said FET comprising:
a first source of radio frequency (RF) signal;
a RF signal output;
a second source of positive drain electrode operating voltage;
a microwave FET having a gate electrode coupled to said first source, a drain electrode coupled to said output and said second source and a source electrode directly coupled to ground; and

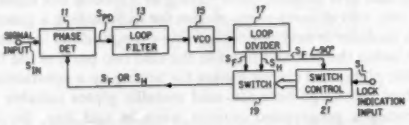
a network coupled to said gate electrode, said network generating a negative gate electrode voltage having a selected nominal value to minimize said intermodulation distortion and a value varying with respect to said nominal value directly proportional to temperature changes to provide said constant gain.

4,011,519
TRANSISTOR AMPLIFIER CIRCUIT
Masami Kawamura, Kodaira, and Yukio Suzuki, Tokyo, both of Japan, assignors to Hitachi, Ltd., Japan
Filed July 30, 1975, Ser. No. 600,431
Claims priority, application Japan, Aug. 2, 1974, 49-88082
Int. Cl.² H03G *3/30*
U.S. Cl. 330—29 **4 Claims**



1. A transistor amplifier circuit comprising a grounded-emitter amplifying transistor, first and second differential transistors, the emitter of said first differential transistor being coupled to the collector of said grounded-emitter amplifying transistor, a parallel circuit which consists of a resistance of comparatively large value and a diode connected between the emitter of said second differential transistor and the collector of said grounded-emitter amplifying transistor, means for applying an input signal to the base of said grounded-emitter amplifying transistor, means for applying an AGC voltage which varies inversely with said input signal to the base of said second differential transistor, and variable absorption current control means connected to the emitter of said grounded-emitter amplifying transistor for controlling the emitter current of said grounded-emitter amplifying transistor so as to decrease said current with increase in said input signal level.

4,011,520
METHOD AND APPARATUS FOR REDUCING PHASELOCK LOOP FM'ING
Dietrich H. Schaefer, Marion, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.
Filed Aug. 11, 1975, Ser. No. 603,412
Int. Cl.² H03B *3/04*
U.S. Cl. 331—14 **8 Claims**



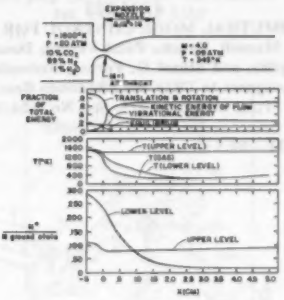
1. Phaselock circuitry having a substantially fixed frequency input signal S_{IN} to be tracked and an input signal S_L indicating whether the loop is locked, said phaselock circuitry comprising:

first means comprising a loop filter whose filtering characteristic is fixed;

second means, including controllable oscillator means, for providing two variable frequency signals S_F and S_H where the frequency of S_F is nominally the same as that of S_{IN}, and the frequency of S_H is an odd multiple N of the frequency of S_F and thus is nominally an odd multiple N of the substantially fixed frequency of S_{IN}; and

third means, including phase detection means connected for continuously receiving said signal S_{IN} and switching means, said third means also connected for receiving S_F, S_H, and S_L, and providing, in accordance with the loop condition as indicated by S_L, to the loop filter input one of two signals S_X or S_Y, where S_X is a phase detection means output signal produced by the phase comparison in said phase detection means of said signals S_{IN} and S_F, and S_Y is a phase detection means output signal produced by the phase comparison in said phase detection means of said signals S_{IN} and S_H, said signal S_X being provided to said loop filter input after S_L indicates no-lock and said signal S_Y being provided to said loop filter input after S_L indicates lock.

4,011,521
HIGH POWERED LASER
Arthur R. Kantrowitz, Arlington; Edward T. Gerry, Boston; Donald A. Leonard, Stoneham, and Jack Wilson, Reading, all of Mass., assignors to Avco Corporation, Cincinnati, Ohio
Filed Feb. 16, 1967, Ser. No. 626,357
Int. Cl.² H01S *3/09, 3/22*
U.S. Cl. 331—94.5 G **10 Claims**



1. A high power laser comprising the combination of a chamber formed with an inlet and an exhaust,

a nozzle in communication with said chamber,

means having an outlet in communication with said inlet for heating a polyatomic gas to provide equilibrium vibrational excitation in said gas, said polyatomic gas having an upper laser level and a lower laser level and a ground state, said upper laser level having an effective relaxation time that is long compared to the effective relaxation time of the lower laser level,

the heated gas being expanded into said chamber in a stream to provide a flow time in said nozzle that is short compared to the effective relaxation time of said upper laser level and long compared to the effective relaxation time of said lower laser level,

the flow of said gas being through said chamber and out of said exhaust,

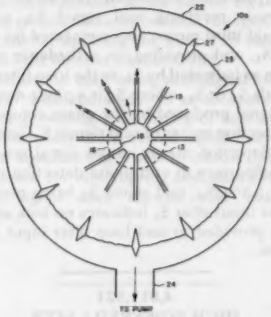
and an optically resonant cavity coupled to said stream.

4,011,522
RADIAL FLOW LASER
Theodore John Falk, Clarence, N.Y., assignor to Calspan Corporation, Buffalo, N.Y.
Filed Feb. 6, 1974, Ser. No. 440,214
Int. Cl.² H01S *3/02, 3/09*
U.S. Cl. 331—94.5 G **28 Claims**

1. A method for producing a population inversion in a laser device by the reacting of first and second reactants including the steps of:

supplying the first and second reactants to supply means located in the interior of the laser device;

radially delivering the first reactant from the supply means;



radially expanding the first reactant to a desired Mach number;

reacting the second reactant with the expanded first reactant whereby a population inversion is achieved.

4,011,523

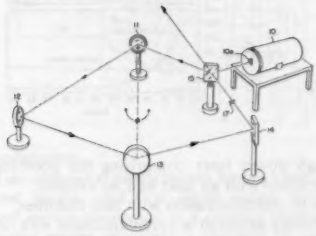
AZIMUTHAL MODE CONTROL FOR LASER

Dennis N. Mansell, Rancho Palos Verdes; Donald L. Bullock, Los Angeles, and Stuart G. Forbes, Redondo Beach, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Oct. 21, 1975, Ser. No. 624,355

Int. Cl.² H01S *3/083*

U.S. Cl. 331—94.5 C **3 Claims**



1. A laser system of the type having a large Fresnel number and an azimuthal mode control for its output beam, said system comprising:

a. a laserable medium;

b. means for pumping said laserable medium;

c. an optical resonant cavity enclosing said medium for generating an output beam;

d. means for geometrically rotating and optically mixing the output beam within said cavity;

e. means for feeding the output beam back through the laser system; and

f. output means for removing the beam from the system.

4,011,524

OPTICAL ELEMENT FOR A LASER

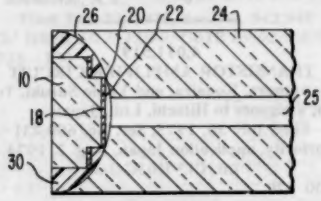
Arthur Herbert Firester, Skillman, N.J., assignor to RCA Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 490,401, July 22, 1974, abandoned. This application Nov. 14, 1975, Ser. No. 632,061

Int. Cl.² H01S *3/08*

U.S. Cl. 331—94.5 C **3 Claims**

1. A laser device comprising a tube having on an outer surface thereof a cavity with a concave surface, an opening into the tube through a central portion of the concave surface, a glass block secured to said tube and extending within said cavity and across said central concave surface portion, a part of said glass block formed as a projection extending toward



said opening, said projection having an annular edge seated in line contact against the concave surface of said cavity and extending around said opening, said projection including an optical reflector enclosed within said annular edge and extending across said opening.

4,011,525

GAS LASER GENERATOR

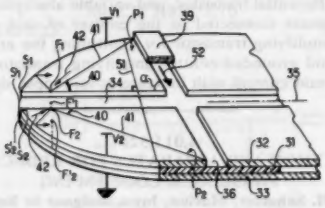
Bruno Godard, Gif sur Yvette, France, assignor to Compagnie Generale d'Electricite, Paris Cedex, France

Filed Dec. 31, 1975, Ser. No. 645,775

Claims priority, application France, Jan. 21, 1975, 75.01795

Int. Cl.² H01S *3/097, 3/22*

U.S. Cl. 331—94.5 PE **7 Claims**



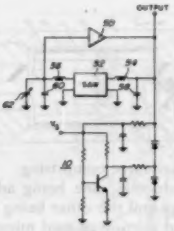
1. In a laser generator comprising: a gaseous active medium; at least one electric excitation line formed by an insulating plate inserted between first and second parallel metallic plates, said first metallic plate having at least one slot separating it into two distinct parts; means for maintaining a gaseous active medium in said slot comprising a longitudinal insulating strip closing the slot and fixed to the said two parts of the first metallic plate; and circuit means for setting up a substantially punctual discharge between said metallic plates suitable for generating a progressive current wave in said line, the improvement comprising:

each said metallic plate comprising at least one section in the shape of a half parabola with pseudofocusses as well as the pseudo-apexes of those half parabolas being respectively arranged on the same straight line perpendicular to the plane of the plates, the rectilinear part of said half parabola forming an angle α which is greater than zero with said slot, and wherein said circuit means sets up said discharge at the level of the pseudo-focusses of said half parabolas generating said progressive current wave.

4,011,526
TEMPERATURE COMPENSATED SURFACE ACOUSTIC WAVE OSCILLATOR

Robert Guy Kinsman, Naperville, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 5, 1976, Ser. No. 646,451
Int. Cl.² H03B *5/04, 5/32*; **H03J** *3/04*
U.S. Cl. 331—107 A **7 Claims**



1. Apparatus for temperature stabilizing a tunable circuit, said circuit having a frequency drift characteristic parabolically related to temperature, said circuit further adapted for tuning by a reactance means connected thereto, the apparatus comprising:

a signal variable reactance means, comprised of two series connected varactor diodes, each diode having a $\delta > 1$, where δ is a factor relating varactor capacity to applied control voltage, coupled to the tunable circuit, for producing a reactance characteristic predeterminedly related to an applied control signal; and

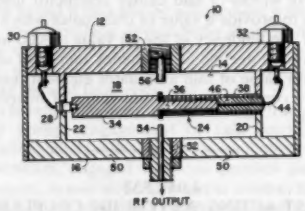
a temperature sensitive signal source means coupled to the signal variable reactance, for generating a control signal predeterminedly dependent on sensed temperature such that the reactance of the signal variable reactance varies predeterminedly as a continuous, true parabolic function of temperature;

whereby temperature drift of the tunable circuit is substantially compensated by a corresponding temperature dependent change in the signal variable reactance.

4,011,527
TEMPERATURE COMPENSATED MICROWAVE CAVITY TRANSISTOR OSCILLATOR

Richard Calvin Havens, Scottsdale, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Aug. 28, 1975, Ser. No. 608,422
Int. Cl.² H03B *5/18*
U.S. Cl. 331—117 D **3 Claims**



1. A cavity oscillator, comprising in combination:

a resonant chamber having lateral side walls of a predetermined dimension and first and second end walls;

a solid state oscillating element for generating energy at a predetermined frequency, said element being disposed through said first end wall and projecting coaxially into said resonant chamber;

means for applying a first direct current (dc) bias potential to said oscillating element externally of said resonant chamber;

output means disposed through side walls of said resonant chamber for extracting power therefrom at said predetermined frequency;

an inner conductor coaxially disposed in said resonant chamber which includes a cylindrical rod member attached at one end thereof to said oscillating element and a hollow sleeve member disposed through said second end wall of said resonant chamber, said cylindrical member having a turned down portion of a predetermined length and being terminated in a radio frequency (RF) open circuit with said hollow sleeve member being insulatively disposed thereabout, and;

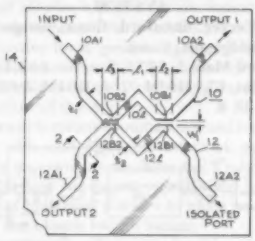
means for applying a second direct current (dc) bias potential to said oscillating element, said means being disposed within said hollow sleeve member and connected to said turned down portion of said inner conductor; and

tuning means disposed through said side wall of said resonant chamber and being capacitively coupled to said inner conductor for varying the frequency of the oscillator.

4,011,528
SEMI-LUMPED ELEMENT COUPLER

Allen F. Podell, Los Altos, Calif.; Leo Young, Bethesda, Md.; Arthur Karp, Palo Alto, and Donald R. Chambers, Menlo Park, both of Calif., assignors to Stanford Research Institute, Menlo Park, Calif.

Filed July 14, 1975, Ser. No. 595,395
Int. Cl.² H01P *5/18*
U.S. Cl. 333—10 **5 Claims**



1. A microwave coupler comprising a dielectric substrate,

a first conductor substantially in the form of a W deposited on said substrate,

a second conductor substantially in the form of a W which is substantially a mirror image of the first conductor deposited on said substrate with the two base sections of said second conductor W capacitively spaced opposite the two base sections of the W formed by said first conductor, and

a conductive coating deposited on the opposite side of said substrate.

4,011,529
DIRECTIONAL POWER DETECTOR FOR PROPAGATING WAVES

Arthur Garcia, Woodbury, N.J., assignor to RCA Corporation, New York, N.Y.

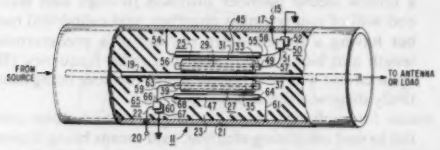
Filed Sept. 25, 1975, Ser. No. 616,886
Int. Cl.² H01P *5/18*
U.S. Cl. 333—10 **5 Claims**

1. In combination,

a distributed capacitive pick-up element coupled in series with a capacitor and positioned along a given length of one of the conductors of a transmission line for providing through said capacitor a first current proportional to the transmission line voltage,

a linear lumped element resistor body coupling element

coupled in series with said capacitor and positioned along and closely spaced to said one conductor for providing strong mutual inductance therebetween and through said capacitor a second current in proportion to the transmission line current,



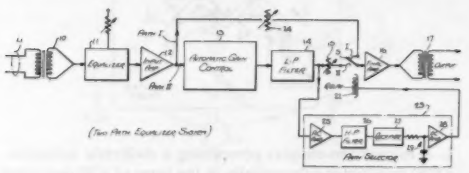
said resistor body coupling element being a linear body of essentially highly resistive material extending substantially said same given length of said one conductor and in the approximate region of said capacitive pick-up element to maintain the phase and magnitude of said second current relative to said line current essentially independent of frequency over a broad band of frequencies.

4,011,530

TWO-PATH TELEPHONE LINE EQUALIZATION SYSTEM

Lawrence M. Carver, Stamford, Conn., assignor to TM Systems, Inc., Bridgeport, Conn.

Filed Mar. 3, 1976, Ser. No. 663,235
Int. Cl.² H03H 7/14; H04M 7/00
U.S. Cl. 333—28 R **6 Claims**



1. A two-path equalizing system interposable in a telephone line carrying supervisory signals whose frequencies lie below a 3 KHz limit and data signals whose frequencies are primarily above this limit, the system comprising:

A. an input circuit coupled to said line to receive the incoming signals;

B. an equalizer to compensate for line losses over the entire range of said frequencies;

C. an automatic gain control circuit;

D. a manually-adjustable gain control device;

E. an output amplifying circuit coupled to said line to return equalized signals thereto;

F. a first path in which incoming signals from said input circuit are applied through said equalizer to said output circuit via siad manually-adjustable gain control circuit;

G. a second path in which incoming signals from said input circuit are applied through said equalizer to said output circuit via said automatic gain control circuit;

H. a switch which, when actuated, transfers the system from operation in a first path mode to operation in a second path mode, the switch normally maintaining the system operative in the first path mode; and

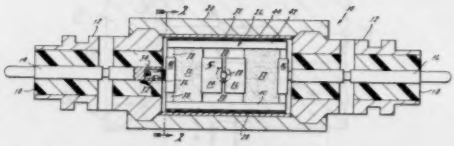
I. an automatic mode selector responsive only to signals in the data signal frequency range and coupled to said switch to actuate same whereby only data signals pass through said second path.

4,011,531

MICROWAVE ATTENUATOR HAVING COMPENSATING INDUCTIVE ELEMENT

Herbert C. Gaudet, Ann Arbor, Mich., assignor to Midwest Microwave, Inc., Ann Arbor, Mich.

Filed Sept. 29, 1975, Ser. No. 617,789
Int. Cl.² H01P 1/22
U.S. Cl. 333—81 A **15 Claims**



1. A microwave attenuator comprising:

a pair of first conductors, one being adapted to receive microwave energy and the other being adapted to transmit an attenuated portion of said microwave energy received at said one conductor;

a ground conductor associated with said first conductors of establishing a microwave transmission path therebetween; and

an attenuator element including a dielectric member having disposed thereon at least two resistive members, one electrically connected in series to said one conductor and in shunt to said ground conductor and another electrically connected in series to said other of said first pair of conductors and in shunt to said ground conductor, said attenuator element further including a first center conductor intermediate portion having a predetermined transverse width disposed on said dielectric member between said two resistive members and connected in series to said one resistive member, a second center conductor intermediate portion having a predetermined transverse width disposed on said dielectric member between said two resistive members and connected in series to said another resistive member whereby series connection of the entirety of said transverse width of said center conductor intermediate portions would provide a db value of said microwave attenuator which would tend to decline in value as frequency increases, said center conductor intermediate portions being spaced apart so as to define a gap therebetween, and at least one inductive member disposed on said dielectric member and bridging said gap between said first and second center conductors intermediate portions for providing a series electrical connection therebetween, said at least one inductive member having predetermined dimensions including a transverse width which is substantially less than said transverse widths of said center conductor intermediate portions to provide a value of inductance which compensates for the tendency of the db value of said microwave attenuator to decline as frequency increases so that the overall db value of said attenuator element remains substantially constant over a wide range of microwave frequencies.

4,011,532

FAST ACTING WAVEGUIDE COUPLER

Norman P. Williams, Linthicum Heights; Roald N. Horton, Ellicott City, and Frank A. Ruff, Annapolis, all of Md., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

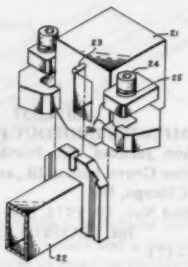
Filed Jan. 14, 1976, Ser. No. 649,107
Int. Cl.² H01P 1/04; F16L 37/00
U.S. Cl. 333—98 R **6 Claims**

1. Means for coupling first and second structural members comprising

flange means extending the coupling surface of said first structural member, and

clamp means connected to lock the coupling surfaces of said structural members together, said clamp means comprising

at least one connector means slideably engaged with said second structural member and adaptable to fixed engagement with the flange of said first structural member, the slideable end of each connector means having a cone-shaped recess therein, and



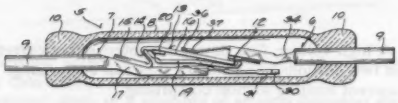
a threaded member having a cone-shaped end portion associated with each connector means, each said threaded member being threaded through a portion of said second structural member and positioned to matingly engage its cone-shaped end portion in the cone-shaped recess of its associated connector means.

4,011,533

MAGNETICALLY ACTUATED SWITCH FOR PRECISE RAPID CYCLE OPERATION

John Dominic Santi, West Allis, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.

Filed Jan. 14, 1976, Ser. No. 648,892
Int. Cl.² H01H *51/28, 3/60*
U.S. Cl. 335—154 **13 Claims**



1. An electrical switching device wherein a movable contacting element is biased in one direction of its motion and is moved in the opposite direction by an actuating force, and wherein movement of said contacting element in one of said directions brings it into abrupt engagement with a cooperating element, said switching device being characterized by:

A. said cooperating element being

1. so supported as to be capable of vibratory motion at one natural frequency and

2. so located and oriented that energy transferred thereto by abrupt engagement of said contacting element thereagainst tends to produce oscillatory motion of said elements, engaged with one another and acting as a system, in said directions and at another frequency; and

B. a plurality of elongated vibratile members, each secured at one end in vibration transmitting relationship to said cooperating element and projecting away from the same, and each having its length transverse to said directions so that said vibratile members can vibrate in said directions relative to the cooperating element,

1. the natural fundamental frequency of such vibration of every vibratile member being substantially resonant with said other frequency so that energy which tends to cause high amplitude of oscillation of the engaged elements can be transferred to and stored by the vibratile members to be manifested in their vibrations, but

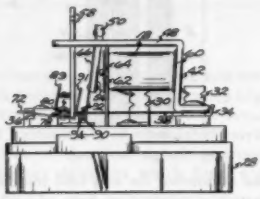
2. said vibratile members having different natural fundamental frequencies of such vibration so that their vibrations mutually interfere to delay retransfer of energy back to the cooperating element until such energy has been substantially dissipated in internal friction of the vibratile members.

4,011,534

MAGNETIC RELAY

Charles D. Flanagan, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 25, 1974, Ser. No. 526,654
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² H01H *45/00*
U.S. Cl. 335—186 **13 Claims**



1. A manually set magnetic interlock bypass relay comprising:

a. a base;

b. electrical interlock switch means mounted on said base operatively connectable in a load circuit;

c. electromotive force generating means including an electromagnetic coil operatively connected to the electrical interlock switch means for opening the load circuit upon energization of the coil;

d. bypass switch means mounted on said base connected in parallel with said electrical interlock switch means including a movable contact arm and a relatively stationary contact arm in overlaying relationship for movement in and out of electrical contact to close and open a circuit through the bypass switch means;

e. latch means operatively engageable with the movable contact arm of the bypass switch means for holding said movable arm in a first and second latched position inn contact with the stationary arm of the bypass switch means;

f. the electromotive force generating means also being operatively coupled to the latch means of the bypass switch means for moving the latch means from a first latched position to a second and then to an unlatched position; and

g. manually operable actuator means engageable with the movable contact arm of the bypass switch means for moving the movable arm into the first latch position.

4,011,535

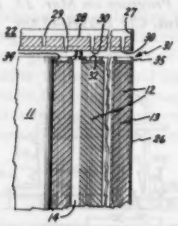
VAPORIZATION COOLED TRANSFORMER

Philip G. Kosky, Bethlehem, Pa., and Heinz Jaster, Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed July 9, 1976, Ser. No. 703,859
Int. Cl.² H01E *27/10*
U.S. Cl. 336—57 **6 Claims**

1. A hermetically sealed vaporization chamber containing heat producing electrical apparatus to be cooled while dielectrically protected and two phase dielectric fluid comprising a liquid and a vapor, said apparatus including a plurality of cooling ducts extending vertically therethrough, said liquid residing at a bottom portion of the chamber and having a liquid level above the bottom of the chamber, said liquid also

being distributed as a film which coats the wall surfaces of the vertical ducts, said vapor being produced by vaporization of said liquid by said heat produced by said apparatus, said vapor occupying space in said chamber above said liquid level, a condenser having one end thereof connected to and communicating with an upper portion of said vaporization chamber occupied by said vapor, a reservoir containing a predetermined mass of non-condensable dielectric gas positioned above said condenser, said condenser having another end connected to and communicating with said reservoir and said gas therein, said gas forming an interfacial contact with said vapor in said condenser at a region therein between said ends of said condenser, said vapor condensing to form liquid condensate in the condenser on one said interfacial contact so that the effective condensation area of said condenser lies between said one end of said condenser and said interfacial contact; distribution means in said chamber positioned above said electrical apparatus for receiving liquid condensate from said condenser, a liquid dam positioned on the upper edges of the apparatus adjacent the associated vertical ducts, the distribution means distributing the liquid condensate uniformly to the liquid dam, the liquid dam distributing the liquid condensate uniformly as a film over the wall surfaces of the adjacent vertical ducts, and a condensate make-up pump for pumping liquid from the bottom portion of the chamber to said distribution means.



4,011,536

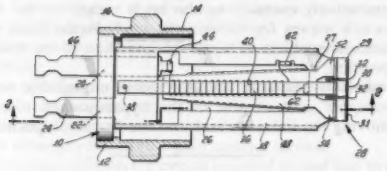
LIQUID SENSOR

Lon E. Bell, Altadena, and Robert W. Diller, Pasadena, both of Calif., assignors to Technar Incorporated, Arcadia, Calif.

Filed Nov. 25, 1974, Ser. No. 526,470

Int. Cl.² H01H 61/02

U.S. Cl. 337—141 **6 Claims**



1. A liquid sensor comprising a frame, a temperature sensitive expansion element mounted on the frame, an electrical heater element operatively associated with the expansion element for applying heat to the expansion element to raise its temperature above ambient, and means actuated in response to changes in length of the expansion element for indicating change in temperature of the expansion element, the liquid being sensed being brought into heat transfer relation with the expansion element for removing heat from the expansion element to lower its temperature and actuate said indicating means, the expansion element including an elongated strip anchored at both ends to the frame, an elongated flat spring member forming a switching element anchored at one end to the frame, the other end of the spring member moving with bending of the spring member about the anchored end, and means connecting the spring member to the expansion element so that the spring member is deflected by lateral movement of the expansion element between the anchored ends.

4,011,537

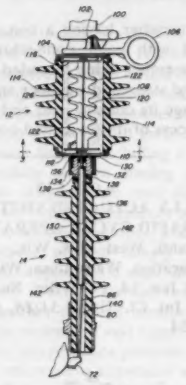
COMPOSITE DROPOUT FUSE DEVICE

Hiram Solomon Jackson, Jr., Northbrook, and Thomas J. Tobin, Morton Grove, both of Ill., assignors to S & C Electric Company, Chicago, Ill.

Filed Nov. 19, 1975, Ser. No. 633,373

Int. Cl.² H01H 71/20

U.S. Cl. 337—171 **8 Claims**



1. A high voltage fuse device for interrupting current between two portions of an electrical circuit comprising:

a current limiting section comprising:

a hollow insulating first housing;

a first end wall mounted to and closing one end of said first housing;

a second end wall mounted to and closing the other end of said first housing;

at least one first fusible member within said first housing electrically connected between said first and second end walls, said first fusible member comprising a current responsive electrically conducting material that is meltable in response to a first current-time characteristic to interrupt current, said first fusible member being formed into a non-linear path within said first housing, the balance of the space within said housing being filled with electrically non-conducting filler material surrounding said first fusible member;

a fuse section serially connected to said current limiting section comprising:

a hollow insulating second housing;

a second fusible member within said second housing and electrically connected to said first fusible member, said second fusible member formed of an electrically conducting material that is meltable in response to a second currenttime characteristic to interrupt current;

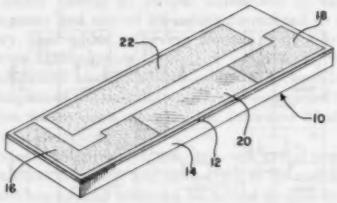
said first and second housings each having surface elongating means on the exterior thereof;

whereby a broad spectrum of fault currents can be interrupted without external flashover arcing.

4,011,538
FLUID SENSOR

John G. Froemel, San Diego, Calif., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Jan. 30, 1976, Ser. No. 653,161
Int. Cl.² H01L 7/00
U.S. Cl. 338—35 7 Claims

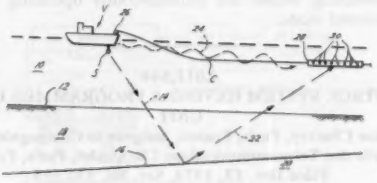


1. A fluid sensor comprising a molecular sieve layer, first and second spaced-apart electrodes and a resistance material deposited on said layer so as to make an electrical connection between said first and second electrodes.

4,011,539
SEISMIC DETECTOR ARRAYS

John R. Rogers, Stafford, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,420
Int. Cl.² G01V 1/20
U.S. Cl. 340—7 R 18 Claims



1. Seismic survey cable apparatus for producing seismic survey data with reduced noise, comprising:

a detector array of a plurality of seismic detectors distributed along the length of a cable, the detectors being located within said array at positions to achieve a detector density conforming to a Gaussian frequency distribution within a frequency band of desired signals to thereby reduce noise in the survey data.

4,011,540
COMBINED ELECTRET HYDROPHONE AND TRANSMISSION LINE

John B. Farr, Houston, Tex., assignor to Standard Oil Company (Indiana), Chicago, Ill.

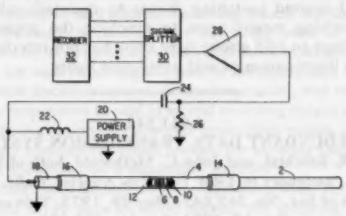
Filed Jan. 22, 1976, Ser. No. 651,668
Int. Cl.² G01V 1/38
U.S. Cl. 340—7 R 13 Claims

1. A hydrophone streamer comprising:

a plurality of transmission line segments, each segment comprising at least two conductors and a dielectric spacer between said conductors, wherein said transmission line has capacitance between said conductors which varies in response to acoustic waves which impinge upon the transmission line, and wherein a voltage change is generated between said conductors proportional to said capacitance change; and

electronic circuit means for coupling two or more of said transmission line segments into a linear array of said segments, said circuit means comprising a voltage controlled oscillator coupled to a first of said segments for generating a carrier wave signal having a characteristic modulated by said voltage change and for coupling the modulated carrier signal to a second segment.

12. In a marine streamer, the use of a transmission line segment having at least two conductors and a dielectric separating the conductors wherein said dielectric has a static elec-

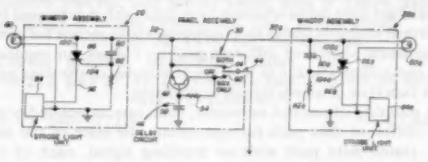


trical charge permanently stored therein, said use comprising the simultaneous conversion of seismic energy impinging upon said segment into an electrical signal to be detected on said conductors and transmission of modulated carrier wave signals representative of electrical signals generated by other separate and distinct detectors which form a part of said streamer.

4,011,541
SINGLE WIRE SYSTEM WITH DELAY SWITCHING CIRCUIT FOR SELECTIVE CONTROL OF NAVIGATION AND STROBE LIGHTS

Lloyd W. Fabry, 1120 Manor Drive, Wilmette, Ill. 60091, and Thomas Vinton Brame, 2715 N. 77th Ave., Elmwood Park, Ill. 60635

Filed June 20, 1975, Ser. No. 588,785
Int. Cl.² G08E 5/00
U.S. Cl. 340—25 6 Claims



1. In an aircraft lighting system including a D.C. voltage power supply in which the metal air frame is ground, wing tip mounted navigation lights and anti-collision strobe lights, and circuit means for illuminating the navigation lights and for activating the anti-collision strobe light units, the improvement comprising:

means for selectively turning off and turning on the anti-collision lights while maintaining the navigation lights illuminated, said improvement obviating any need to disassemble airplane wing and fuselage components for the installation of supplemental wiring,

and constituting electrical power control and first switching means for selectively supplying operating voltage to the navigation lights and strobe light units together, and the navigation lights alone, and operable using a single wire conductor only from said D.C. voltage power supply to the site of said navigation lights and said strobe light units for delivery of lamp-illuminating power thereto, said improvement including:

second switching means interposed between and interconnecting said circuit means and said strobe light units for controlling the application of voltage from the power supply thereto;

delay circuit means for controlling actuation of said second switching means,

said first switching means being positionable between a first position in which said delay circuit means is by-passed to establish a circuit flow path directly from the D.C. voltage power supply to both the navigation lights and the strobe light units, thereby to deliver to said aircraft lighting system voltage effective to energize concurrently both said navigation lights and said anti-collision strobe units, and a second position in which said delay circuit means in interposed electrically between said power supply and said second switching means to maintain said second switching means open to preclude the application of voltage to said strobe light units but not interfering with the illumination of said navigation lights.

4,011,542

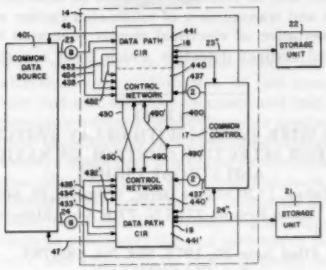
REDUNDANT DATA TRANSMISSION SYSTEM

James R. Baichtal, and John C. McDonald, both of Los Altos, Calif., assignors to TRW Inc., Los Angeles, Calif.

Division of Ser. No. 365,045, May 29, 1973. This application Oct. 10, 1974, Ser. No. 513,880

Int. Cl.² H04Q *9/00*; **G08B** *19/00*

U.S. Cl. 340—147 LP **9 Claims**



1. In a system including a plurality of independent and redundant data paths wherein each data path is activated by a different enabling signal and including alarm means for generating alarm signals of different priority classes, an apparatus for controlling the active and inactive states of the data paths as a function of alarm signals comprising,

a plurality of control networks, each one associated with a different data path for controlling the state of the associated data path with an enabling signal, each of said control networks including enabling means responsive to one or more alarm signals for forcing the associated data path inactive provided no other enabling means receives a higher priority alarm and including means for enabling the associated data path active in response to an inactive state of an enabling signal from another enabling means.

4,011,543

LOW CROSSTALK OPTICAL SWITCH

Richard A. Soref, Newton Centre, and Lloyd R. Schissler, Jamaica Plain, both of Mass., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Feb. 20, 1976, Ser. No. 660,196

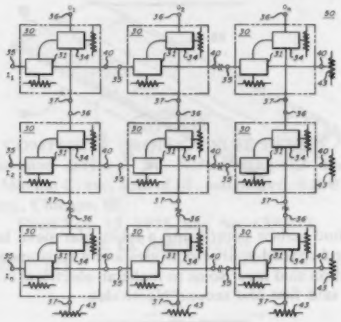
Int. Cl.² G02B *5/14*; **G02F** *1/00*; **H04B** *9/00*; **H04Q** *1/00*

U.S. Cl. 340—166 R **15 Claims**

1. A low crosstalk optical switch comprising:

first means selectively operable in a first mode and a second mode having an input port and first and second output ports for switchably coupling said input port to said first and second output ports, said input port being coupled to said first output port during operation in said first mode and to said second output port during operation in said second mode; and

second means selectively operable in a first mode and a second mode having a first input port coupled to said first output port of said first switching means, a second input port and an output port, for switchably coupling said first and second input ports to said output port, said output port being coupled to said first input port during operation in said first mode and to said second input port during operation in said second mode whereby an optical signal at said input port of said first switching means is coupled to said output port of said second switching



means when said first and second switching means are simultaneously operating in said first mode, and an optical signal at said input port of said first switching means is coupled to said second output port of said first switching means and an optical signal at said second input port of said second switching means is coupled to said output of said second switching means when said first and second switching means are simultaneously operating in said second mode.

4,011,544

CONTROL SYSTEM HAVING A PROGRAMMED LOGIC UNIT

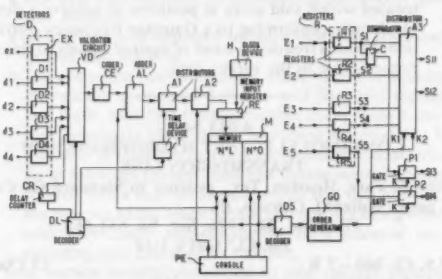
Antoine Cherrey, Paris, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed Dec. 13, 1974, Ser. No. 532,575

Claims priority, application France, Dec. 20, 1973, 73.45708

Int. Cl.² G05B *11/32*; **G06F** *3/00*

U.S. Cl. 340—172.5 **5 Claims**



1. Logic control system intended for controlling a set of elements by transmitting data and orders to the set of elements, more particularly for use in a telecommunication exchange, comprising:

a directly addressable memory and associated addressing means,

a set of input detectors receiving data concerning the state of the said elements,

a set of registers for storing said data to be transmitted to said set of elements to be controlled, and

output means connected to said set of registers and receiving as inputs the data stored in said registers for sending to said elements orders and data,

said memory being composed of addressable lines, each containing a line number and a coded instruction word, which is sent to the said addressing means and output means, and the said addressing means comprising:

an address register connected to said memory,

an adder having its output connected to said address register and one of its inputs connected to said memory, said adder receiving as one input a line number from said memory,

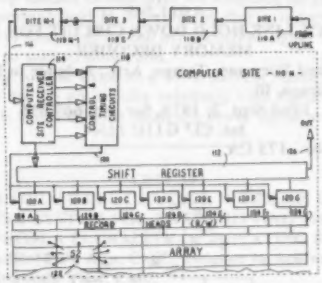
a validation circuit, whose inputs are connected to the outputs of the said detectors, and controlled by instruction words each allowing the selection of at least one input detector,

a coder, whose inputs are connected to the outputs of the validation circuit and delivering at its output a binary number to said adder to be added to said line number supplied to said adder from said memory in order to obtain the address of the next line to be read in the memory, said binary number from said coder corresponding to the address increment to said address of the next line to be read in the memory.

4,011,545
COMPUTER AND COMMUNICATIONS SYSTEMS EMPLOYING NEW ARCHITECTURES

Mark T. Nadir, Warren, N.J., assignor to Ridan Computers, Inc., White Plains, N.Y.

Filed Apr. 28, 1975, Ser. No. 569,651
Int. Cl.² G06F *15/16*
U.S. Cl. 340—172.5 **60 Claims**



1. Communication system for transferring data between a large number of sites over transmission line means wherein said sites can each be originating and/or receiving sites, comprising:

sync and counting means, at each site, for detecting a plurality of repetitive time or space oriented matrices on said transmission line means for conveying and/or storing data, each said matrix including a determinator section having a multiplicity of address positions for entry into addresses of those sites seizing an address position in a given matrix, and an array section having a plurality of nests for transmitting and receiving data, whereby the number of said address positions in a given matrix is much smaller than the size of the address set of the sites in the system;

an available address position detector, at each site, connected to said sync and counting means for detecting an available or empty address position in said determinator section;

address entry means, at each originating site, responsive to said available address position detector, for entering the address for an intended receiving site in said detected empty determinator address position to thereby seize said position;

address receiving means, at each receiving site, including an address detector for detecting its own address received in said determinator section;

secondary number generating means, at each originating site, responsive to said address entry means, for providing a secondary number that is used to identify and locate those nests of said array section wherein data from said originating site is entered;

a secondary number receiving means, at each receiving site, responsive to said address receiving means, for determining the same secondary number being used in a given matrix by its originating site so that those nests containing data for said receiving site can be identified and located;

array data location means, at the originating and receiving sites, responsive to said sync and counting means and said respective secondary number generating means and secondary number receiving means, for locating those array nests identified by a secondary number;

array data entry means, at the originating sites, responsive to said array data location means, for entering data in those located nests for communication to intended receiving sites;

array data receiving means, at each receiving site, responsive to said array data location means, for receiving said intended data sent by its respective originating site in said located nests; and

address deletion means, at each receiving site, responsive to said array data receiving means, for deleting the address received by said site in said address position in the determinator section after data is received in the nests of the same matrix, thereby making said address position available to other sites desiring entry into said matrix; whereby said data entered and received in said array nests is communicated between an originating and receiving site by means of the secondary number for the duration of the matrix in which an address position has been seized

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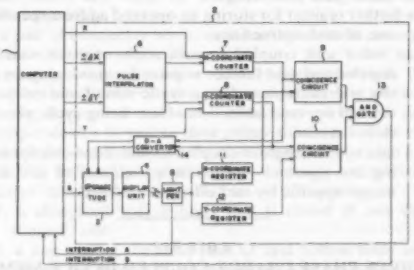
4,011,546
DISPLAY APPARATUS

Yoshihiro Kawata, and Kansei Iwata, both of Tokyo, Japan, assignors to Iwatsu Electric Co., Ltd., Tokyo, Japan

Filed July 22, 1975, Ser. No. 598,018
Claims priority, application Japan, July 27, 1974, 49-86282; July 27, 1974, 49-86284; July 27, 1974, 49-86285
Int. Cl.² G06F *3/14*
U.S. Cl. 340—172.5 **4 Claims**



1. In display apparatus of the type wherein a picture image corresponding to an information train given by an electronic computer is written in a storage tube and the content of the storage tube is repeatedly read out of the storage tube to display the picture image on the screen of a cathode ray tube, the improvement which comprises coordinate registers adapted to store the content of the coordinate values of the position of a light pen on said screen of the cathode ray tube when the light pen receives light, coordinate counters connected to receive the information train, directly and through a pulse interpolator, from said electronic computer for changing

their content in accordance with the picture image written in said storage tube by a first interruption to said electronic computer which is made at the time when said light pen receives light, and coincidence circuits connected to receive contents of said coordinate counters and coordinate registers for providing a second interruption through an AND gate to said electronic computer when the contents of said coordinate registers and said coordinate counters coincide with each other, thereby said second interruption signal ensuring precise correspondence between said information train from said electronic computer and the position designated by said light pen.

4,011,547

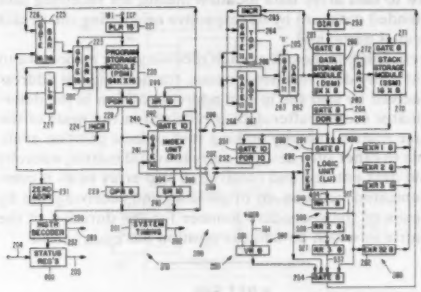
DATA PROCESSOR FOR PATTERN RECOGNITION AND THE LIKE

Milton Jay Kimmel, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 272,698, July 17, 1972, Pat. No. 3,959,777. This application Jan. 19, 1976, Ser. No. 650,103

Int. Cl.² G06F *9/20, 7/38*

U.S. Cl. 340—172.5 **8 Claims**



1. Apparatus for indexing an operand address for accessing data from a storage unit of a data processor having a decoder for fetching and interpreting a plurality of instructions, said apparatus comprising:

a status register for storing one of a plurality of modulus values, said one modulus value being specified by one of said instructions;

an index register for storing an index quantity specified by one of said instructions;

a further register for storing an operand address specified by one of said instructions;

an index unit coupled to said status register, said index register and said further register for producing an effective address representing a cyclic sum of said index quantity and operand address, said sum being cyclic about said stored modulus value; and

a data address register coupled to said index unit for accessing one operand value from an address of said storage means specific by said effective address.

4,011,548

THREE PHASE CHARGE-COUPLED DEVICE MEMORY WITH INHIBIT LINES

Godavarish Panigrahi, Piscataway, N.J., assignor to Burroughs Corporation, Detroit, Mich.

Filed July 2, 1975, Ser. No. 592,401

Int. Cl.² G11C *11/44*

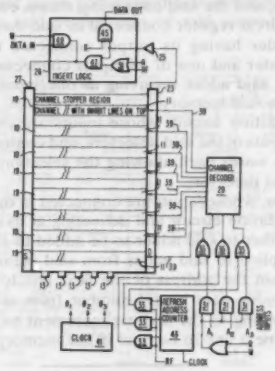
U.S. Cl. 340—173 CA **7 Claims**

1. A charge coupled device shift register memory structure activatable by a plurality of clock phases produced by a clock generator comprising:

a plurality of charge coupled device shift register channels for storing data bits in the form of charge packets;

a thin dielectric layer disposed over each said channel;

a plurality of parallel gate electrode means disposed perpendicular to said channels upon said dielectric layer for shifting said data bits in said channel in response to said clock phases; and



means for selectively varying the potential between said plurality of gate electrode means with respect to selected of said shift register channels, for selectively inhibiting or aiding the said clock shifting of said data bits in response to the potential presented by said potential varying means.

4,011,549

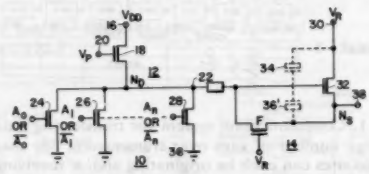
SELECT LINE HOLD DOWN CIRCUIT FOR MOS MEMORY DECODER

Alan Richard Bormann, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Sept. 2, 1975, Ser. No. 609,855

Int. Cl.² G11C *11/44*

U.S. Cl. 340—173 CA **6 Claims**



1. In a memory system, an address decode circuit comprising:

a gate circuit means having an output node and a plurality of binary inputs thereto for producing at said output node a logical "1" voltage level in response to a particular combination of said binary inputs and a logical "0" voltage level thereat when another combination of said binary inputs occurs;

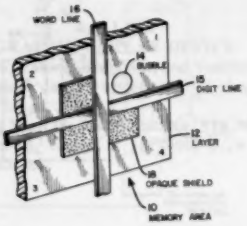
a second circuit means having an input coupled to said output node and an output conductor for producing a logical "1" voltage level at said output conductor in response to a control input coupled to said second circuit when said particular combination of said binary inputs occurs; and

circuit means coupled between said output conductor and said output node for causing a logical "0" voltage level to appear at said output conductor when said other combination of said binary inputs causes a logical "0" voltage level to appear at said output node.

4,011,550
METHOD OF IMPROVING THE OPERATION OF A SINGLE WALL DOMAIN MEMORY SYSTEM

Ernest J. Torok, and Marlin M. Hanson, both of St. Paul, Minn., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Nov. 28, 1975, Ser. No. 636,235
Int. Cl.² G11C *11/14*
U.S. Cl. 340—174 TF **4 Claims**



1. In a bubble memory system including a planar layer of a magnetizable material in which single wall domains or bubbles may be sustained and moved between first and second stable positions in said layer, which stable positions are associated with an inductively coupled stripline, by a drive current signal that is coupled to said layer by said stripline, the method of preventing said bubbles from escaping from the magnetomotive effect of said drive current signal to transfer said bubbles between said first and second stable positions or from sticking in either said first or second stable position, comprising:

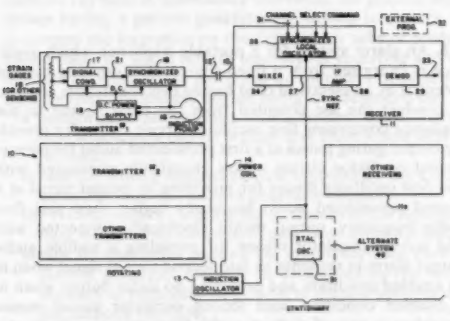
separating said stripline a predetermined distance S from the top surface of said layer for rounding off the peaks of the normal field H_z component that is inductively coupled to said layer by the drive current signal that is coupled to said stripline; and,

coupling to said stripline a drive current signal of a waveform having an initially relatively high signal amplitude that is followed by a relatively lower signal amplitude.

4,011,551
MULTIPLE DATA CHANNEL WIRELESS DATA COUPLING SYSTEM FOR TRANSMITTING MEASURED DATA FROM A PLURALITY OF ROTATING SOURCES

Alan J. Adler, Palo Alto, Calif., assignor to Acurex Corporation, Mountain View, Calif.

Filed Feb. 23, 1976, Ser. No. 660,070
Int. Cl.² G08C *19/16*
U.S. Cl. 340—189 M **7 Claims**

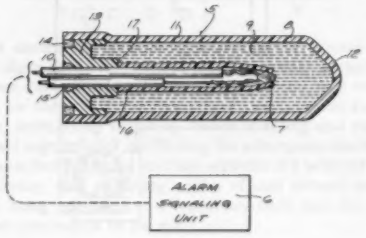


1. A multiple data channel wireless data coupling system for transmitting measured data from a plurality of rotating sources producing data source signals to a stationary receiver comprising: a stationary low frequency power source; a plurality of high frequency transmitter means each corresponding to one of said plurality of rotating data sources and mounted for rotation therewith each of said transmitter means including oscillator means for generating a unique high frequency carrier signal to provide one of said data channels and including means for modulating said carrier signal with a corresponding data source signal, said oscillator means having a reference input for determining said unique carrier frequency; coupling means for coupling said stationary low frequency power source to all of said rotating reference inputs; demodulating means included in said stationary receiver for receiving said plurality of modulated carrier signals and for demodulating such signals to provide said data source signals; and wireless coupling means for coupling said demodulating means to said transmitter means.

4,011,552
TEMPERATURE SENSOR THAT IS NON-RESPONSIVE TO TRANSIENT CONDITIONS

Patric C. Quirke, Whitewater, Wis., assignor to Whitewater Electronics, Inc., Whitewater, Wis.

Filed Jan. 7, 1976, Ser. No. 646,995
Int. Cl.² G08B *21/00*
U.S. Cl. 340—228 R **4 Claims**



1. A temperature responsive sensor adapted for installation in a cabinet of a food freezer and cooperable with an output device for producing a perceptible alarm signifying a malfunction of the food freezer, said sensor being non-responsive to short term rises of temperature in the cabinet to above a predetermined value, such as occur during automatic defrosting of the cabinet, but being capable of causing the output device to produce its alarm when temperature in the cabinet remains above said value for a significantly long time, said sensor comprising:

A. a pair of conductor wires, each having one end connectable with said output device;

B. a temperature responsive element connected with the other end of each of said conductor wires, said element being cooperable with said conductor wires and said output device to initiate production of an alarm when the temperature of said element rises above said value;

C. means defining a capsule having a interior substantially larger than said element, said means comprising

1. a elongated hollow body that is closed at one end thereof, and

2. a cap sealing the other end of said hollow body and having an interior surface substantially normal to the axis of the body, said conductor wires extending through said cap in sealing relation thereto and substantially along said axis;

D. a length of heat shrunken plastic tubing snugly surrounding said element and the portions of the conductor wires that are inward of the cap, one end of said length of tubing edgewise abutting said surface on the cap so that said length of tubing cooperates with the cap and the conductor wires to maintain said element and said portions of the conductor wires in substantially concentric relation to said hollow body and hold said element spaced from said one end thereof; and

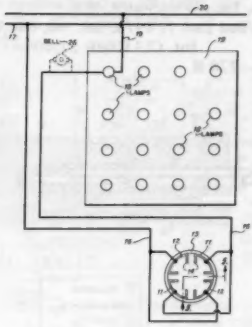
E. a quantity of non-toxic material substantially filling the interior of the capsule, said material being one that passes from a solid state to a liquid state at a temperature substantially equal to said predetermined value and upon the addition of latent heat of fusion thereto, so that when said material is in its solid state the temperature of said element cannot rise above said value until a substantial amount of heat has been added to said material.

4,011,553

REMOTE DETECTOR TO INDICATE LEAKAGE OF LIQUIDS IN TOILET TANKS

Luis Delgado Barri, Benito Juarez y Madero, Tampico, Tamaulipas, Mexico

Continuation of Ser. No. 503,897, Sept. 6, 1974, abandoned. This application Mar. 19, 1976, Ser. No. 669,433
Claims priority, application Mexico, Oct. 24, 1973, 146996
Int. Cl.² G08B *21/00*
U.S. Cl. 340—242 **1 Claim**



1. A remote detector to indicate discharge of electrically-conductive liquid from a stationary tank having at least one outlet pipe, comprising:

an annular support member of electrically-insulating material located within said outlet pipe;

a pair of arcuate electrodes constituted by respective curved plates of electrically-conductive material, the curved plates being secured at their convex surfaces to the interior of the annular support member at substantially the same position along the outlet pipe but being spaced apart from one another about the inner perphery of the annular support member; first and second electrical conductor members connected to the electrodes respectively; and

remote indicator means connected to said first electrical conductor,

whereby when said second electrical conductor and said remote indicator means are connected to respective terminals of a source of electrical energy, an electrical circuit through the remote indicator means is completed, thereby to energize the indicator means, when electrically-conductive liquid establishes electrical contact between the electrodes.

4,011,554

INTRUSION ALARM APPARATUS

George N. Butler, Boca Raton, Fla., assignor to Butler & Law Incorporated, Deerfield Beach, Fla.

Filed June 3, 1976, Ser. No. 692,330
Int. Cl.² G08B *13/26*
U.S. Cl. 340—274 R **6 Claims**

1. In an A.C.-powered alarm apparatus having:

an electrical plug for insertion in an A.C. power socket;

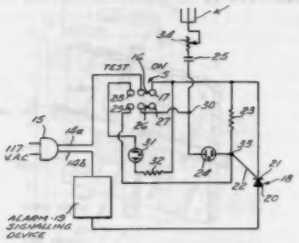
and an electrical circuit connected to said plug and including: capacitive switch means; and means for signalling an alarm in response to the operation of said capacitive switch means;

the improvement which comprises:

test switch means in said circuit which is operable

a. in a first position to disable said alarm signalling means from being operated by said capacitive switch means, and

b. in a second position to enable said alarm signalling means for operation by said capacitive switch means;



and electrically-energized polarity indicator means connected to said test switch means

a. in said first position of the latter to indicate whether the plug is inserted in the A.C. power socket with the correct polarity for operating said alarm signalling means, and

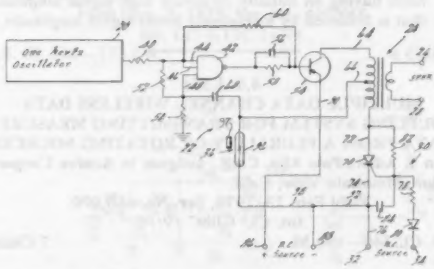
b. to be disabled in said second position of the test switch.

4,011,555

RADIO AND TELEVISION ALARM SYSTEM

Jack L. Pearce, Roseville, Mich., assignor to Monte Markowitz, Southfield, Mich., a part interest

Filed Aug. 20, 1974, Ser. No. 498,943
Int. Cl.² G08B *21/00*
U.S. Cl. 340—280 **6 Claims**



1. An alarm system for a portable appliance which appliance is energized from a fixed source of alternating current potential by an electrical cord having two conductors adapted to conduct the a-c potential from the fixed source to the appliance comprising first oscillator circuit means for providing output gating pulses at a first preselected audio frequency, second oscillator circuit means electrically connected with said first oscillator means for providing an output signal at a second preselected audio frequency higher than said first audio frequency, output means electrically connected with said second oscillator means for providing a audible audio output alarm in response to said second output signal when in an enabled condition and providing no audio output when in a disabled condition, said second oscillator circuit means providing a pair of distinct audio frequency signals to said output means, said output means comprising solid state switching means having a first condition disabling said output means and a second condition enabling said output means, electrical circuit means connecting said solid state switching

means to the two conductors utilized to conduct electrical energy from the fixed source to the appliance, said solid state switching means being operable independently of said first oscillator means and being in said first condition in response to the a-c potential being at the two conductors and being in said second condition in response to the a-c potential being absent at the two conductors whereby said audio output alarm will be sounded when the two conductors are removed from the a-c potential at the fixed source.

4,011,556

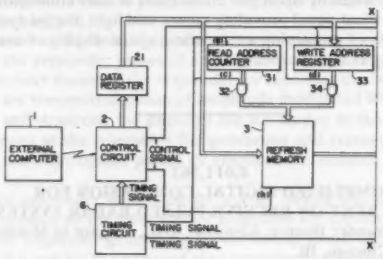
GRAPHIC DISPLAY DEVICE

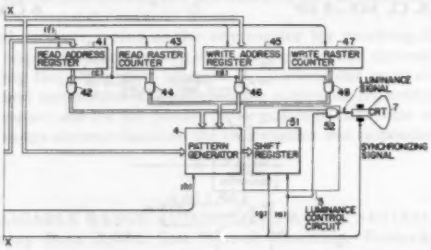
Yutaka Tochitani; Takashi Shinbata, and Yoshitsugu Morioka, all of Musashino, Japan, assignors to Yokogawa Electric Works, Ltd., Tokyo, Japan

Filed May 28, 1975, Ser. No. 579,785

Int. Cl.² G06K *15/20*; G06F *3/14*

U.S. Cl. 340—324 AD **9 Claims**





1. A graphic display device of the type receiving data and instructions from an external computer and displaying patterns such as alphanumeric characters, symbols, etc. upon a cathode ray tube in accordance therewith, the graphic display device having a pattern generator for storing luminance data to control the formation on the cathode ray tube of predetermined patterns, and a refresh memory for receiving and storing data designating the particular arrangement of patterns to be displayed, the display device being characterized by

a pattern generator formed with a random access memory into which data can be written and from which data can be read;

means for writing luminance data supplied by the external computer into the pattern generator memory;

the refresh memory storing the addresses of the luminance data written into the pattern generator memory; and

means for thereafter reading the luminance data from the pattern generator memory as designated by the refresh memory to form an arrangement of graphic patterns upon the cathode ray tube;

whereby the pattern generating memory need store formation data only for those characters actually being displayed on the cathode ray tube, and the memory thereby requires only a small storage capacity.

4,011,557

DEVICE IN A TIME PIECE FOR FEEDING AN ELECTRO-LUMINESCENT DISPLAY

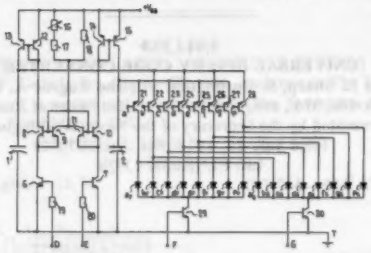
Fernand Chételat, Cortaillod, and Pierre Hersberger, Neuchatel, both of Switzerland, assignors to Ebauches S.A., Neuchatel, Switzerland

Continuation-in-part of Ser. No. 495,044, Aug. 5, 1974. This application May 13, 1975, Ser. No. 576,976

Claims priority, application Switzerland, Aug. 23, 1973, 12120/73

Int. Cl.² H01L *33/00*

U.S. Cl. 340—336 **11 Claims**



1. A device for controlling a luminescent display having plural digits each composed of plural segments, comprising at least one current source, at least one capacitor, first switching means for controlling the charging of said capacitor from said source, and second switching means coupling said capacitor with said segments for controlling the subsequent discharge of said capacitor through a selected segment of a selected digit of said display, said switching action of said second switching means being repeated at a frequency such that the display appears continuous to the eye.

4,011,558

DC GAS PANEL ELECTRICAL DISPLAY DEVICE

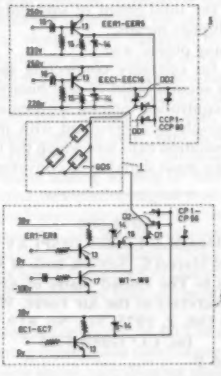
Graham Trevor Sharpless, Hassocks, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 22, 1974, Ser. No. 516,985

Claims priority, application United Kingdom, Oct. 22, 1973, 49016/73

Int. Cl.² G06F *3/14*

U.S. Cl. 340—324 M **6 Claims**



1. An electrical display device which comprises a DC gas panel having row conductors and column conductors, an addressing circuit arranged to effect block write/random erase addressing which includes a first sub-matrix of erase driver circuits for supplying erase pulses to the row conductors and

a second sub-matrix of erase driver circuits for supplying erase pulses to the column conductors, each of said sub-matrices comprising in respect of each conductor to be energised of the appertaining conductor group (row or column) a cross-point output formed by the interconnection of two unique co-ordinate erase driver circuit outputs, means for providing isolation for the DC gas panel which comprise a pair of diodes at each cross-point output through which the two erase driver circuit outputs are connected respectively to form the cross-point output, said diodes being connected to isolate operationally each cross-point output from the other cross-point outputs of the same sub-matrix, while permitting the application of the appropriate erase and bias voltage amplitudes across the elements of the matrix.

4,011,559

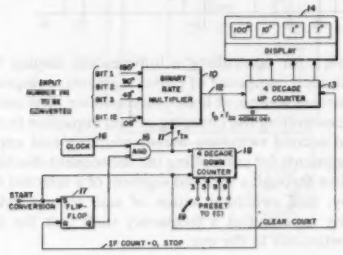
UNIVERSAL BINARY CODE CONVERTER

Donald L. Sharp, S. Burlington, Vt., and Eugene A. Frekko, Rockville, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 21, 1975, Ser. No. 597,842

Int. Cl.² H03K *13/24*

U.S. Cl. 340—347 DD **8 Claims**



1. Apparatus for converting an input signal from one binary form to another format comprising, in combination,

a binary rate multiplier means connected to receive as a first input said binary signal to be converted and as a second input a series of timing pulses,

said binary rate multiplier means producing during application of said timing pulses a series of output pulses whose total count is directly proportional to the value of said input binary signal to be converted,

a counter means operably connected to register in the desired format the total count of said output pulses from said rate multiplier means,

a source of timing pulses, and

control means for operably connecting said timing pulse source to the second input of said binary rate multiplier means for a controlled interval with means for selecting different intervals to correspond with the total desired number of resolution cells into which the maximum possible value of the input signal to be converted is subdivided.

4,011,560

PROGRAMMABLE LIGHT DISPLAY SYSTEM

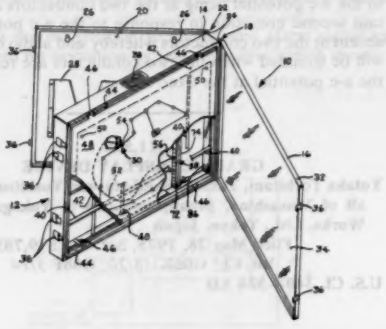
Harry Mason, and Marcel C. Schiess, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 2, 1975, Ser. No. 619,112

Int. Cl.² G08B *5/36*

U.S. Cl. 340—366 R **7 Claims**

1. A programmable light display system comprising a support, a semi-rigid, readily penetrable display board mounted upon said support, a flexible cable, a light emitting source operably connected to one end of said cable and an electrical connector operably connected to the other end of said cable, said connector being designed for easy insertion through said display board, means for providing an electrical signal, said connector being capable of being electrically connected to said electrical signal providing means in only a predetermined



position, whereby upon the connection of said connector to said electrical signal providing means said light display system is capable of presenting an accurate, visual display of events occurring at various locations.

4,011,561

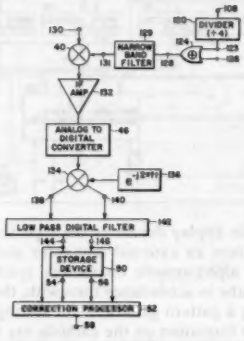
SIMPLIFIED DIGITAL CONVERSION FOR COHERENT-ON-RECEIVE PULSED RADAR SYSTEM

Eric Alexander Dounce, Glendale, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed July 7, 1975, Ser. No. 594,135

Int. Cl.² G01S *9/05*

U.S. Cl. 343—5 DP **6 Claims**



1. In a pulsed radar system wherein coherence is achieved in the receiver of the radar system by applying a stored complex digital number, representing the phase relationship between each transmitted pulse and a stable reference oscillator signal, as a correction factor to a series of complex digital numbers, representing the phase relationships between subsequent samples of the received signal and the stable reference oscillator signal, the improvement comprising:

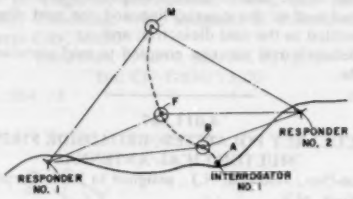
means for digitizing the phase relationship of each transmitted pulse with respect to the reference oscillator signal and for digitizing the phase relationships between the received signals and the reference signal; and

means for digitally multiplying said digitized phase relationships by the factor $e^{-j2\pi fn}$, where f is equal to one half the video bandwidth of the radar system, to provide real and imaginary parts of digital complex numbers representing said phase relationships.

4,011,562
SINGLE FREQUENCY RADIO RANGING SYSTEM

Robert L. Bruce, San Diego, Calif., assignor to Cubic Industrial Corporation, San Diego, Calif.

Filed Mar. 21, 1975, Ser. No. 560,339
Int. Cl.² G01S 9/56
U.S. Cl. 343—6.5 R **16 Claims**



1. A system for measuring the range distance between an interrogator at a first point and a responder at a second point comprising:

means at the interrogator for generating and transmitting to the responder pulses of amplitude modulated RF carrier,

receiver means at the responder for receiving the interrogator transmitted pulses of amplitude modulated RF carrier and detecting the phase of the RF carrier in the pulses,

means at the responder for generating and transmitting to the interrogator pulses of amplitude modulated RF carrier,

said responder generated RF carrier having the same frequency as the interrogator generated RF carrier,

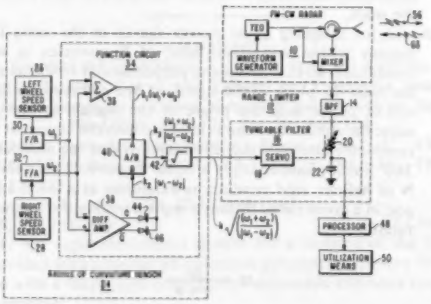
said responder generating means having phase shift means for making the phase of the transmitted responder generated RF carrier phase coherent with the phase of the transmitted interrogator generated RF carrier received by the responder receiver means,

and receiver means at the interrogator for receiving the responder transmitted pulses of RF carrier and determining the phase shift between the interrogator generated and transmitted RF carrier in the responder transmitted pulses and the RF carrier in the pulses to determine the range distance between the interrogator and responder.

4,011,563
VARIABLE RANGE AUTOMOTIVE RADAR SYSTEM

Anthony Drea Robbi, East Amwell Township, Hunterdon County, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 6, 1976, Ser. No. 655,841
Int. Cl.² G01S 9/02
U.S. Cl. 343—7 VM **10 Claims**



1. In a system for detecting the presence and range of remote objects within a predetermined maximum range from a vehicle in the direction of travel of said vehicle, said direction of travel having a radius of curvature, said system being of the type including first means for generating a probe signal in the direction of travel of said vehicle, said probe signal being reflected from said remote targets back to said vehicle, and second means for receiving said reflected signals and determining therefrom the presence and range of said remote objects from said vehicle, the improvement comprising:

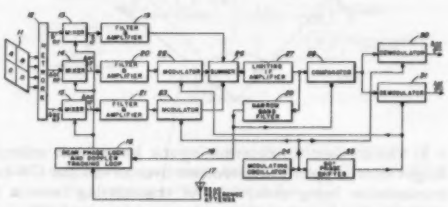
third means for generating a signal indicative of said radius of curvature of said travel of said vehicle; and

fourth means, responsive to said radius of curvature signal for altering said maximum range of said system in accordance with said radius of curvature.

4,011,564
PHASE MODULATED MONOPULSE SYSTEM

Joseph F. Gulick, Jr., Clarksville, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 7, 1966, Ser. No. 564,519
Int. Cl.² G01S 9/22
U.S. Cl. 343—16 M **8 Claims**



1. In a monopulse continuous wave radar receiving system producing azimuth and elevation RF difference signals and a RF sum signal developed from the RF signals received at a receiving antenna from a target, the amplitude variation of said azimuth RF difference signal representing the variation in the azimuth pointing error of the receiving antenna, the amplitude variation of said elevation RF difference signal representing the variation in the elevation pointing error of the receiving antenna;

a modulating means for accepting an IF difference signal derived from an RF difference signal;

a modulating oscillator connected to said modulating means for supplying a first modulating signal for said IF difference signal and a second modulating signal for producing a double sideband suppressed carrier modulation of said IF difference signal whose variation in amplitude represents the variation in a pointing error of the receiving antenna, said suppressed carrier modulation signal of said IF difference signal being in quadrature with an IF sum signal derived from the sum RF signal;

summing means accepting an IF sum signal of the sum RF signal and connected to said modulating means, said summing means adding to said IF sum signal, said suppressed carrier modulation signal from said modulating means in quadrature thereto establishing a phase modulated composite signal whose variation in phase represents the variation in a pointing error;

filtering means being connected to said summing means for selecting the sum signal from said composite signal from said summing means;

comparator means connected to said summing means and to said filtering means, said comparator means accepting said composite signal, said filtering means feeding to said comparator means an IF sum signal having a 90° phase shift from said IF sum signal of said composite signal, said comparator means eliminating said IF sum signal of said composite signal and extracting from said suppressed carrier modulation signal of said composite signal an amplitude modulating signal at a frequency of said modu-

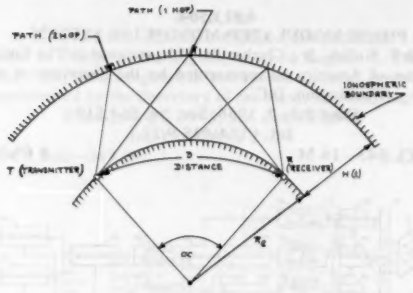
lating oscillator whose variation in amplitude represents the variation in the pointing error of the receiving antenna from the target.

4,011,565

METHOD OF DETERMINING IONOSPHERIC REFLECTION HEIGHT

Kurt Toman, Belmont, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 19, 1976, Ser. No. 678,321
Int. Cl.² G01S 3/02
U.S. Cl. 343—112 A **3 Claims**



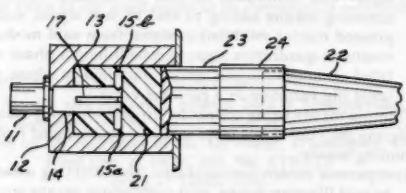
1. The method for determining the ionospheric reflection height from doppler measurements over an oblique CW radio transmission being comprised of transmitting from a first predetermined position first and second identical CW signals obliquely toward a radial moving ionospheric boundary, said first and second signals being single-hop and multi-hop, respectively, receiving at a second predetermined position displaced from said first predetermined position said first and second signals, the radial motion of said boundary imparting different rate-of-phase-path changes to the one-hop, multi-hop transmissions causing a separate doppler shift for each at the receiver and determining said ionospheric boundary height from the doppler ratio of each of said received one-hop and multi-hop transmissions.

4,011,566

IN-LINE COAX-TO WAVEGUIDE TRANSITION USING DIPOLE

Hajime Honda, Lexington, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed July 25, 1975, Ser. No. 599,298
Int. Cl.² H01Q 13/24
U.S. Cl. 343—785 **4 Claims**



1. A transition for coupling the end of a coaxial line, having a center conductor and an outer conductor, to a circular waveguide comprising:

a. a dipole positioned on the said outer conductor at the said end of the coaxial line;

b. a pair of axial slots positioned in the said outer conductor in a plane normal to the axis of the said dipole, extending to the end of the coaxial line;

c. means for short-circuiting the said center conductor of the said coaxial line to the said outer conductor at the said end of the coaxial line;

d. a dielectric material filling the said waveguide and positioning the said slotted end of the coaxial line and the said dipole in the said circular waveguide whereby the said slotted end of the coaxial line and the said dipole are imbedded in the said dielectric; and

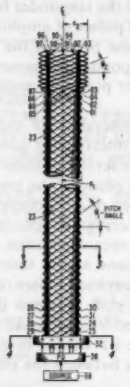
e. a dielectric rod antenna coupled to said circular waveguide.

4,011,567

CIRCULARLY POLARIZED, BROADSIDE FIRING, MULTIHELICAL ANTENNA

Oded Ben-Dov, Medford, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Jan. 28, 1976, Ser. No. 653,035
Int. Cl.² H01Q 1/36
U.S. Cl. 343—853 **9 Claims**



1. An antenna for radiating substantially circularly polarized signals over a given band of frequencies omnidirectionally about and substantially broadside a support mast comprising:

a number N of conductors helically wound about and spaced from the support mast a given radial distance from the support mast with said conductors equally spaced from each other and wound in the same direction about the mast,

means for coupling equal power signals at the same frequency within said given band of frequencies to said conductors so that in a plane perpendicular to the axis of the mast the phase of the signals at one conductor is 180° out of phase with the phase of the signals at the two adjacent conductors and is in phase with the signals at the conductor alternate therefrom and so that the number of 360° linear phase changes is equal to one-half the number N of helices, said conductors extending at a pitch angle and in a given radial distance approximating the following relationship:

$$M = \frac{ka}{\cos \psi}$$

where

$M = \frac{1}{2}$ N the number of helices

$k = 2\pi/\lambda$

where λ is measured at a frequency within said given band of frequencies,

a = the radius of the helix, ψ is the pitch angle of the helices, and N is greater than 4 and is an even integer.

4,011,568

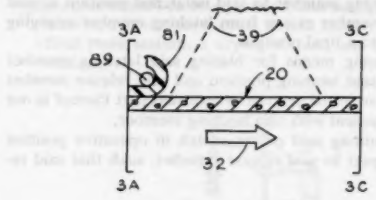
ELECTROPHOTOGRAPHIC CAMERA

Charles D. Oughton, Interlochen, Mich., and Edward T. Bradley, Caledonia, Wis., assignors to Colorkrome, Inc., Traverse City, Mich.

Filed Nov. 1, 1974, Ser. No. 519,930

Int. Cl.² G03G *15/00*

U.S. Cl. 354—3 **6 Claims**



1. A camera comprising: a camera housing: lens means at the front of said camera housing for projecting a light image on a field at the rear of said camera housing; electrophotographic print material having an electrically charged electrophotoconductive surface, said charged surface being covered with a sheet of dielectric material; print support means in and at the rear of said camera housing in line with said lens means for holding an electrophotoconductive base in the field of said lens means such that the lens means projects its image to be photographed thereonto; shutter means mounted in said camera housing between said lens means and said support means for selectively opening and closing said lens means relative to said print support means; advancing means in said camera housing for advancing said electrophotographic print material from one side of the field of vision of said lens means, through said field of vision of said lens means and out of the field of vision of said lens means; sheet removal means in said camera housing upstream from the field of said lens means relative to the direction of advancement by said advancing means whereby said sheet of dielectric material is removed from said print as said print is advanced by said advancing means into the field of said lens means; toner applicator means in said camera housing adjacent said advancing means and out of the field projected by said lens means for applying toner to the exposed print as it is advanced by said advancing means; said housing including means facilitating removal of said print therefrom following its development.

4,011,569

EXPOSURE CONTROL SYSTEM FOR A CAMERA

Yukio Mashimo, Tokyo, and Tadashi Ito, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 30, 1975, Ser. No. 618,124

Claims priority, application Japan, Oct. 1, 1974, 49-112926; Oct. 1, 1974, 49-112927; Oct. 21, 1974, 49-121142

Int. Cl.² G03B *7/08*

U.S. Cl. 354—38 **17 Claims**

1. An exposure control system for a camera of the type provided with a shutter preselection automatic exposure range and with a diaphragm preselection automatic exposure range, compising;

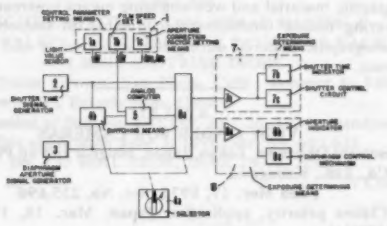
a. shutter time information generating means for generating an analog signal corresponding to a preselected shutter time value,

b. diaphragm aperture information generating means for generating an analog signal corresponding to a preselected diaphragm aperture value,

c. light value sensor means for generating an analog signal corresponding to the level of brightness of a scene being photographed,

d. selecting means having a plurality of switched positions including a first position for said shutter preselection and a second position for said diaphragm preselection automatic exposure range,

e. first switching means cooperative with said selecting means and having two input terminals connected to the respective output terminals of said shutter time information generating means and said diaphragm aperture information generating means upon setting of said selecting means to either said first or said second position for causing either said shutter time dependence analog signal or said diaphragm aperture dependence analog signal to exit therefrom,



f. computer circuit means responsive to the outputs of a least said light value sensor means and said first switching means for deriving an exposure value,

g. second switching means cooperative with said selecting means and having three input terminals connected to the respective output terminals of said shutter time information generating means, said diaphragm aperture information generating means and said computer circuit means, and having first and second output terminals from which shutter control and diaphragm aperture control analog signals exit respectively,

h. shutter time control means having an input terminal connected to said first output terminal of said second switching means for controlling the period of actuation of the shutter of said camera, and

i. diaphragm control means having an input terminal connected to said second output terminal of said second switching means for controlling the size of aperture of the diaphragm means of said camera.

4,011,570

PHOTOGRAPHIC CAMERA

Emile Frans Stiévenart, Hoboken, and Hugo Frans Deconinck, Deurne-Zuid, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Dec. 2, 1975, Ser. No. 636,842

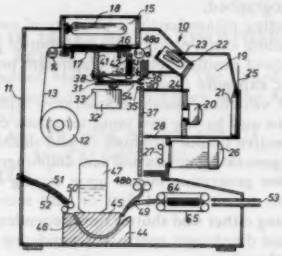
Claims priority, application United Kingdom, Dec. 4, 1974, 52504/74

Int. Cl.² G03B *17/24*, *17/50*

U.S. Cl. 354—89 **14 Claims**

1. A photographic camera for exposing a photographic light-sensitive material simultaneously to different subjects to form images thereof at different locations on such material, which camera comprises a storage station containing a roll of photographic material, at least two exposure stations arranged in succession, one of said stations incorporating masking means adapted to shield at least two areas of the material while the remainder thereof is being exposed to light at that station, the other station having optical projecting means for projecting an image of one subject onto one of said initially shielded areas and an image of at least one other subject onto another of such areas of the photographic material, transport

means for delivering predetermined lengths of photographic material from said roll to said exposure stations, severing means actuatable to sever said predetermined lengths of photographic material and web engaging means upstream of said severing means intermittently operable to immobilize the photographic material during the actuation of said severing means.



4,011,571

VIEW FINDER FOR CAMERAS

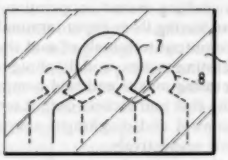
Yasutoshi Okuzawa, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa

Filed Mar. 17, 1972, Ser. No. 235,696

Claims priority, application Japan, Mar. 18, 1971, 46-18470[U]

Int. Cl.² G03B 13/02

U.S. Cl. 354—219 **8 Claims**



1. In a view finder for a camera comprising a sight field for viewing an object to be photographed, the improvement comprising:

means for positioning within said sight field a plurality of mark means of a different size, position and configuration corresponding to, the size, position, and configuration of the objects being photographed when said objects are properly centered and positioned with respect to the camera lens system as seen through said view finder;

whereby, centering of a given object to be photographed and moving the camera relative to the object such that the object within the sight field corresponds in size, position and configuration to a corresponding mark means insures a proper position of the object relative to the camera and at a proper distance therefrom.

4,011,572

SHUTTER RELEASE MECHANISM FOR CAMERAS WITH AN ELECTRIC SHUTTER

Kunio Mita, Wako, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 9, 1975, Ser. No. 566,476

Claims priority, application Japan, Apr. 10, 1974, 49-41527

Int. Cl.² G03B 17/38

U.S. Cl. 354—266 **4 Claims**

1. A shutter release mechanism for a camera incorporating an electrically controlled shutter, and including a power switch having normally closed contacts for controlling the supply of electrical power to the electrical circuit controlling the operation of the shutter, said mechanism comprising:

a pivotable shutter operating member,

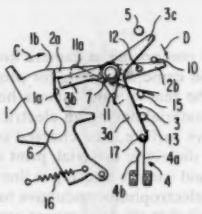
first spring biasing means for biasing said shutter operating member towards shutter operating position,

a latching member pivotably mounted adjacent said shutter operating member for movement between a latched position wherein an end portion thereof directly engages the shutter operating member to hold said shutter operating member in a non shutter operating position against the bias of said first spring biasing means and an unlatched position wherein said end portion allows said shutter operating member to rotate under said bias to said shutter operating position,

a release member mounted in juxtaposition to said latching member and having a part thereof which operatively engages with said latching member for positively shifting said latching member to said unlatched position as said release member moves from latching member engaging position to a final position,

second biasing means for biasing said latching member towards said latching position and said release member towards an initial position where said part thereof is out of engagement with said latching member,

means mounting said power switch in operative position with respect to said release member, such that said release member, when biased to said initial position maintains the normally closed contacts of said switch open;



and depressible release button means operatively positioning adjacent said release member for contact therewith,

said release button, said release member, said latching member and said switch contacts being positioned relative to one another such that said release button, when depressed, rotates said release member from said initial position to said latching member engaging position and then to said final position against the bias of said second biasing means, said release member moving away from said contacts to permit same to close prior to reaching said latching member engaging position, whereby said latching member remains unmoved during movement of said release member from a position permitting said contacts to close to said latching member engaging position, and means responsive to movement of said latching member to unlatched position to maintain said release member at said final position out of contact with said power switch to maintain the power switch contacts closed; said means for maintaining the power switch contacts closed comprising means carried by said shutter operating member directly engaging said release member to prevent rotation of said release member under the force of said second biasing means.

4,011,573

APPARATUS FOR DEVELOPING DENTAL X-RAY FILMS

Louis J. Braico, Elgin, Ill., assignor to Rinn Corporation, Elgin, Ill.

Filed Dec. 23, 1974, Ser. No. 535,941

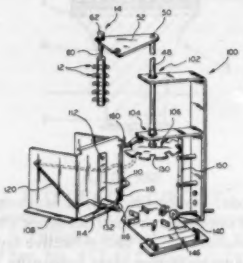
Int. Cl.² G03D 3/08, 13/10

U.S. Cl. 354—322 **14 Claims**

6. In film developing apparatus having a frame defining processing stations including loading and unloading stations and a plurality of receptacles disposed in an arcuate path

concentric about a vertical axis, a carrier member mounted for rotation about said axis in a substantially horizontal plane over said receptacles, means for dependently supporting from said carrier member one or more film hangers positioned for sequential insertion into said receptacles, means for intermittently rotating said carrier member to move said hangers about said path, means for raising and lowering said carrier member in strokes of predetermined length in timed sequence to said rotating means to dispose said hangers elevationally to be moved from one of said receptacles to another in sequence and lower said hangers for insertion into the respective receptacles, and means for moving said carrier member while in the lowered position thereof for agitating the hangers when disposed within the respective receptacles, the improvement wherein:

said stations include in sequence about said axis said loading station, a developer station, a rinse station, a fix station, a final rinse station, a drying station, and said unloading station,



said developer, rinse, fix and drying stations being defined by said receptacles,

said hangers including means for clipping to the hangers the individual films carried thereby,

and including means for spinning the individual hangers when disposed at said drying station and within the receptacle thereof for spin drying of the film carried by the individual film hangers,

said spinning means including;

means for rotatably removably mounting the individual film hangers on said carrier member,

a spin driving member journalled in the lower end of said drying station receptacle,

means for selectively spin driving said spin driving member,

and means for releasably coupling the individual hangers to said spin driving member when the individual hangers are disposed within said drying station receptacle.

4,011,574

JUNCTION ARRAYS FOR SUPERCONDUCTING AND NONSUPERCONDUCTING APPLICATION

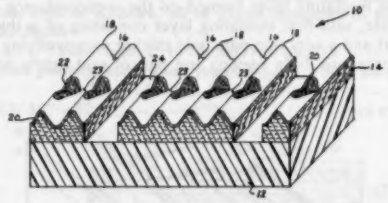
Shyh Wang, El Cerrito, and Won-Tien Tsang, Albany, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 12, 1975, Ser. No. 604,280

Int. Cl.² H01L *49/02, 39/22*

U.S. Cl. 357—6 **6 Claims**

1. A superconduction junction array device comprising: a substrate base; a photoresist material covering one side of said base, said resist having a series of closely spaced, parallel groves and ridges on its open face; a superconducting metallic coating covering said photo-resist material, and a first score mark transverse to said ridges and cutting through one ridge



removing the said metallic coating from the ridge but not from the groove adjacent thereto.

4,011,575

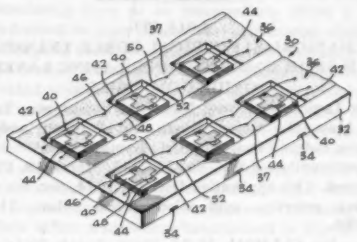
LIGHT EMITTING DIODE ARRAY HAVING A PLURALITY OF CONDUCTIVE PATHS FOR EACH LIGHT EMITTING DIODE

Henry Tobin Groves, Van Nuys, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Continuation of Ser. No. 492,195, July 26, 1974, abandoned. This application June 3, 1976, Ser. No. 692,621

Int. Cl.² H01L *33/00, 23/48, 29/44, 29/52*

U.S. Cl. 357—17 **1 Claim**



1. A light emitting diode array, comprising:

a substrate;

a series of first parallel conductor strips on the substrate;

a plurality of LEDs in electrical contact with each of the first conductor strips;

a series of second parallel conductor strips on the substrate spaced apart from the first conductor strips and transverse thereto, the second conductor strips including extensions thereof extending between each pair of associated LEDs on adjacent first conductor strips; and

wire bond conductors stitched bonded from each LED to the second conductor strip extension adjacent thereto and then to the next adjacent LED.

4,011,576

NONVOLATILE SEMICONDUCTOR MEMORY DEVICES

Yukimasa Uchida, Yokohama, and Takeshi Matsuo, Yokosuka, both of Japan, assignors to Tokyo Shibaura Electric Company, Ltd., Japan

Filed Aug. 25, 1975, Ser. No. 607,711

Claims priority, application Japan, Aug. 28, 1974, 49-98553

Int. Cl.² H01L *29/78, 29/34*

U.S. Cl. 357—23 **6 Claims**

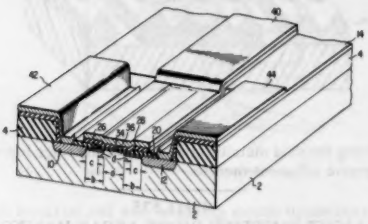
1. A nonvolatile semiconductor memory device comprising:

spaced apart source and drain regions of one conductivity type within a semiconductor substrate of the other conductivity type;

first and second spaced apart lightly doped regions of the same conductivity type as said source and drain regions, and formed within the semiconductor substrate in be-

tween said source and drain regions, said first lightly doped region contacting said source region, and said second lightly doped region contacting said drain region;

a first insulating layer formed on the semiconductor substrate, said first insulating layer consisting of a thicker part and a very thin part, said thicker part overlying said source and drain regions and part of said lightly doped



regions and said thin part overlying the area between said lightly doped regions and the rest of said lightly doped regions;

a second insulating layer applied on said first insulating layer; a gate electrode applied on said second insulating layer; and source and drain electrodes connected to said source and drain regions.

4,011,577

MECHANICAL-ELECTRICAL FORCE TRANSDUCER WITH SEMICONDUCTOR-INSULATING LAYER-TIN OXIDE COMPOSITE

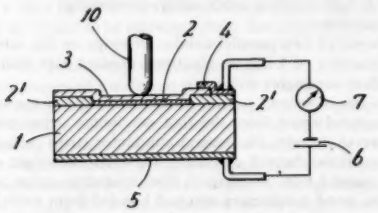
Shigeru Tanimura, Kyoto; Nobuyuki Yamamura, Takatsuki, and Masanobu Koide, Kyoto, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Continuation of Ser. No. 342,392, March 19, 1973, abandoned. This application Dec. 10, 1974, Ser. No. 531,447

Claims priority, application Japan, Mar. 21, 1972, 47-28788

Int. Cl.² H01L *29/84, 29/96, 29/48, 29/56*

U.S. Cl. 357—26 **30 Claims**



1. A semiconductor mechanical-electrical transducer comprising:

a semiconductor composite including a semiconductor substrate having a main surface,

a first insulating material film of substantial thickness formed on a portion of the main surface of said substrate and defining an exposed portion of said substrate,

a second insulating material layer deposited on said exposed portion of said main surface of said substrate defined by said first insulating material film, said second insulating material layer consisting essentially of SiO_2 and being approximately 15 to 80 A in thickness,

a tin oxide layer deposited on said second insulating material layer,

said semiconductor composite having a barrier portion defined by said substrate, said second insulating material layer and said tin oxide layer having a rectifying characteristic, and

means for applying mechanical force to said barrier portion of said composite, said composite exhibiting an increased ratio of reverse current therethrough in response to an applied mechanical force relative to the level of reverse current in the absence of an applied mechanical force.

4,011,578

PHOTODIODE

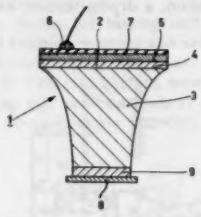
Lambertus Jacobus Maria Bollen, and Cornelus Petrus Theodorus Maria Damen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed June 5, 1975, Ser. No. 584,156

Claims priority, application Netherlands, June 12, 1974, 7407811

Int. Cl.² H01L *27/14, 23/48*

U.S. Cl. 357—30 **8 Claims**



1. A photodiode, comprising: (a) a semiconductor body having regions of opposite conductivity types which are separated by a p-n junction, (b) an anti-reflective layer at, at least one region said anti-reflective layer consisting essentially of tin-doped indium oxide and forming an ohmic connection with said one region, (c) a metallic contact element disposed over said anti-reflective layer and electrically connected therewith, and, (d) a bismuth oxide layer disposed between said antireflective layer and said metallic contact element.

4,011,579

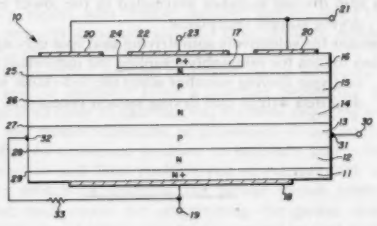
SEMICONDUCTOR GATE TURN-OFF DEVICE

Jearld L. Hutson, P.O. Box 34235, Dallas, Tex. 75234

Filed Apr. 7, 1975, Ser. No. 565,965

Int. Cl.² H01L *29/743*

U.S. Cl. 357—38 **6 Claims**



1. A gate turn-off device comprising:

a semiconductor body including at least six layers of alternating first and second conductivity types of semiconductor material to form a plurality of interior rectifying junctions,

a first exterior layer of said body formed from a first conductivity type material more heavily doped than the remaining layers of said first conductivity type in order to provide a low resistivity emitter, said first exterior layer covering only a portion of the exterior surface of said body and disposed in contact with a first intermediate layer of said second conductivity type material having a portion extending to the remaining portion of the exterior surface of said body,

a second exterior layer of said body formed from said second conductivity type material having a high doping level in contact with a second intermediate layer of said second conductivity type material having a lower doping level,

a gate electrode formed in contact with said first intermediate layer,

a second electrode formed in contact with said first exterior layer, and

a third electrode formed in contact with said second exterior layer,

said device operable to be biased into a regenerative process to transition said interior rectifying junctions from blocking conditions into avalanche conditions,

means for applying a gating signal to said gate electrode to provide fast turn-off characteristics by terminating said regenerative process, the termination of said regenerative process being facilitated by the effective removal of said first exterior layer emitter during turn-off due to the low resistivity of said emitter which causes reverse current to be injected into said first intermediate layer during switching.

4,011,580

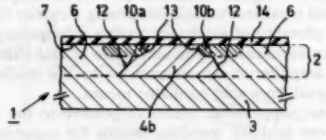
INTEGRATED CIRCUIT

Wolfdietrich Georg Kasperkovitz, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 472,412, May 22, 1974, abandoned. This application Jan. 23, 1976, Ser. No. 651,773

Int. Cl.² H01L *27/02*

U.S. Cl. 357—51 **7 Claims**



1. An integrated circuit comprising a semiconductor body having an epitaxial semiconductor layer of a first type conductivity and of a given thickness on a semiconductor substrate of a second opposite type conductivity, isolation zones of the second type conductivity extending through the epitaxial layer to define in the epitaxial layer a plurality of first type conductivity isolated islands, plural circuit elements selected from the group consisting of resistors, capacitors, diodes and transistors being located in said islands, at least one of said circuit elements being a resistor formed by the first type epitaxial layer material of one of said islands, means for effecting electrical connection to spaced points of the epitaxial layer material in said one island to form resistor connections for said resistor, the doping near the surface of the epitaxial material in said one island where it remains of the first type being substantially homogenous, and a surface boundary zone of the second type conductivity located in the isolation zone and adjoining a substantial part of the boundary of the said island containing the resistor forming a P-N junction determining the overall resistance of the resistor between its connection points, said boundary zone having a depth of penetration which is smaller than the thickness of the epitaxial layer, the concentration of second type dopants in the isolation zones being greater than the concentration of first type dopants in the isolated islands, and the concentration gradient of second type dopants at the boundary zone-island P-N junction being substantially greater than that at the isolation zone-island P-N junction.

4,011,581

MOSFET ANTIPARASITIC LAYER

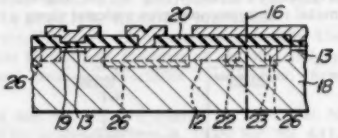
Masaharu Kubo, Hachioji; Minoru Nagata, and Yasunobu Kosa, both of Kodaira, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 2, 1970, Ser. No. 68,973

Claims priority, application Japan, Sept. 5, 1969, 44-70000

Int. Cl.² H01L *29/78, 27/04*

U.S. Cl. 357—52 **15 Claims**



1. A semiconductor device which comprises

a. a semiconductor substrate which is of a first conductivity type and has one main surface,

b. a plurality of semiconductor regions which are of a second conductivity type opposite to said first type and are formed on the main surface of said substrate,

c. an insulating layer which is provided on said main surface and has openings, and

d. a wiring metal layer which is provided on said insulating layer, and in which

a first part of said wiring metal layer is provided through said insulating layer as an intermediary above a gate region formed between at least two neighboring semiconductor regions thereby to from a normal insulating gate type field effect transistor, another semiconductor region is provided adjacent to at least one of said semiconductor regions constituting said insulating gate type field effect transistor, and a second part of said wiring metal layer is provided through said insulating layer as an intermediary above a parasitic gate region formed between said at least one of the semiconductor regions and said other semiconductor region thereby to form a parasitic insulating gate type field effect transistor, characterized in that a high impurity concentration layer having the same conductivity type as that of said substrate and having an impurity concentration higher than that of said substrate is provided in the entire main surface of said semiconductor substrate except the gate region of the normal insulating gate type field effect transistor so as to define PN junctions with said plurality of semiconductor regions, said high impurity concentration layer having a predetermined value of impurity concentration which is low enough to make the breakdown voltage of said PN junctions higher than an operating voltage applied to said wiring metal layer and which is high enough not to induce a parasitic channel layer in said major surface of said substrate under said second part of said wiring metal layer when the operating voltage is applied to said wiring metal layer.

4,011,582

DEEP POWER DIODE

Harvey E. Cline, and Thomas R. Anthony, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 411,011, Oct. 30, 1973, abandoned. This application May 11, 1976, Ser. No. 685,284

Int. Cl.² H01L *29/04, 29/161*

U.S. Cl. 357—60 **16 Claims**

1. A semiconductor device comprising

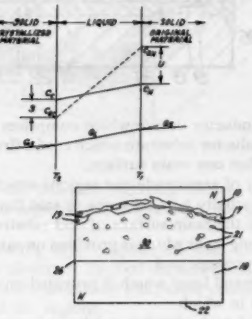
at least two integral regions of semiconductor material;

each region having a predetermined level of resistivity, a predetermined type conductivity, and two opposed major surfaces which are, respectively, the top and bottom surfaces thereof;

each of the at least two regions being produced from individual wafers, or bodies, of semiconductor material oriented in an abutting surface to surface relationship and joined to each other by a layer of recrystallized semiconductor material of portions of the mutually adjacent surfaces of the wafers formed in situ by thermal gradient zone melting;

the semiconductor material of at least one of the regions being recrystallized semiconductor material of its respective wafer formed in situ by the migration of a melt of metal-rich semiconductor material along a thermal gradient aligned parallel with a first preferred crystal axis of the material of the respective wafer by the same thermal gradient zone melting process practiced at a predetermined elevated temperature which joined the two regions together, and

the predetermined level of resistivity and the predetermined type conductivity of the recrystallized semiconductor material being determined by the solid solubility limit of that metal of the melt migrated through the wafer in that semiconductor material at that predetermined elevated temperature to impart the level of resistivity and type conductivity thereto.



4,011,583

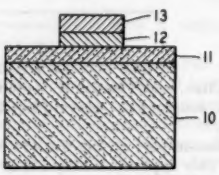
OHMICS CONTACTS OF GERMANIUM AND PALLADIUM ALLOY FROM GROUP III–V N-TYPE SEMICONDUCTORS

Hyman Joseph Levinstein, Berkeley Heights, and Ashok Kumar Sinha, Murray Hill, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 502,451, Sept. 3, 1974, Pat. No. 3,965,279. This application May 27, 1976, Ser. No. 690,400

Int. Cl.² H01L *23/48, 29/46, 29/62, 29/64*

U.S. Cl. 357—67 **6 Claims**



1. A semiconductor device comprising a body of semiconductor material of *n* conductivity type comprising a group III element and group V element and an ohmic contact formed on one surface of said body wherein said contact comprises a combination of Pd-Ge compounds, Pd-group III element compounds and Pd-group V element compounds.

4,011,584

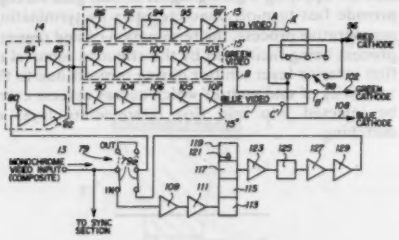
SYSTEM FOR COLOR PRESENTATION OF INFORMATION REPRESENTED BY AMPLITUDE VARYING VIDEO SIGNAL

Lawrence C. Puckett, 4600 Burnett Road, Austin, Tex. 78757

Continuation-in-part of Ser. No. 198,878, Nov. 15, 1971, abandoned, and a continuation-in-part of Ser. No. 310,460, Nov. 29, 1972, abandoned, and a continuation-in-part of Ser. No. 438,550, Feb. 1, 1974, abandoned. This application Sept. 17, 1974, Ser. No. 506,720

Int. Cl.² H04N *9/02*

U.S. Cl. 358—82 **6 Claims**



1. A system for converting an amplitude varying monochrome video input signal into an output signal repesentative of a particular amplitude segment of the said input signal, said system being effective to generate a color display indicative of the information represented by the monochrome video signal and comprising in combination:

oscillator means for generating a first signal,

modulator means responsive to the said input video signal for modulating the said first signal of the oscillator means in accordance with the varying amplitude of the monochrome signal, thereby to provide an output signal from said oscillator means comprising a carrier frequency and a plurality of sidebands having a frequency distribution representative of the amplitude of said video signal,

RF amplifier means responsive to the modulated output signal from said oscillator means,

carrier suppression means responsive to the output signal from said RF amplifier means for suppressing the said carrier frequency,

frequency selective amplifier means coupled to said carrier suppression means for generating an output signal responsive to one of said sidebands being within the response characteristics of said frequency selective amplifier means and varying only within a preselected amplitude increment of the monochrome video input signal,

detector means responsive to the output signal from said frequency selective amplifier means, and

a multiple input cathode ray tube having its input terminals coupled to the output of said detector means,

means for selecting and enhancing the said amplitude increment of said monochrome video input signal furnished to said modulator.

4,011,585

MAGNETIC RECORDING REPRODUCING SYSTEM

Yoshimitsu Sunaga, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed July 11, 1975, Ser. No. 594,973

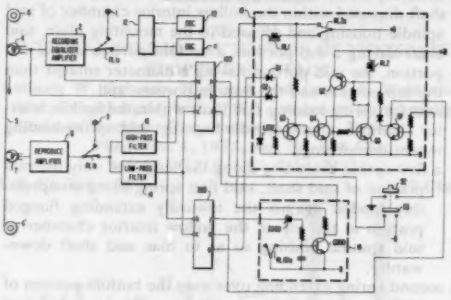
Claims priority, application Japan, July 12, 1974, 49-79996; July 12, 1974, 49-79998; Aug. 20, 1974, 49-95378

Int. Cl.² G11B *5/45, 5/008*

U.S. Cl. 360—25 **8 Claims**

1. A magnetic recording-reproducing system comprising: a reference signal recording means for recording the signal on a recording medium, means for reproducing the signal recorded by said recording means, a recording bias osciallator, means

coupled to said oscillator for linearly varying the recording bias from a minimum toward a maximum level, means for rectifying and smoothing said reproduced reference signal to produce a first output signal, means for comparing the first



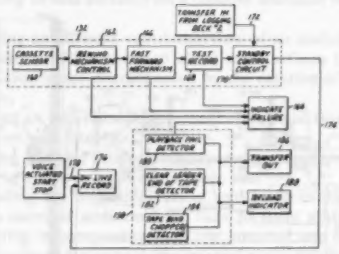
output signal with a stored second output signal which is an attenuated version of the peak value of the first output signal, and coincidence means coupled to said comparing means for stopping the variation of the recording bias when the levels of said first and second output signals coincide.

4,011,586

VOICE LOGGING RECORDER FOR USE WITH PRELOADED CASSETTES

Sheldon Lee Pastor, St. Paul, Minn., and Dan J. Argento, Thousand Oaks, Calif., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 28, 1975, Ser. No. 635,872
Int. Cl.² G11B 5/12, 27/36
U.S. Cl. 360—61 **8 Claims**



1. A voice logging recorder adapted to utilize magnetic recording tape in preloaded magazines having a logging deck comprising

a. transport means having a standby mode position at which a magazine is positioned to enable the tape to be transported at high speed and a run mode position at which the tape is transported at uniform speed,

b. means generating an input signal indicative of voice data and enabling switching to the run mode position in response to the input signal, and

c. a verification network activated upon insertion of a magazine into the deck including

i. means for rewinding the tape and for producing a tape-advance signal upon completion thereof,

ii. means responsive to the tape-advance signal for advancing the rewound tape and for thereupon producing a test-enable signal,

iii. means responsive to the test-enable signal for recording and playing back signals and for producing an operate signal in response to said playing back, verifying that the deck and tape thereof are operative,

iv. means responsive to said operate signal for switching the deck into the standby mode position and into the run mode position in response to a said input signal to record said voice data, and

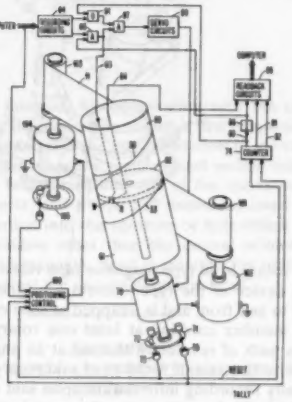
v. means for automatically activating a failure mechanism upon the absence of any of said advance, test-enable and operate signals.

4,011,587

ROTARY HEAD MAGNETIC RECORDER FOR USE WITH A SPECIFIC RECORD MEMBER

Nelson K. Arter; Thomas F. Eichhorn, both of Boulder County, and Clement H. Kalthoff, Boulder, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 451,270, March 14, 1974, Pat. No. 3,932,894. This application Sept. 8, 1975, Ser. No. 611,476
Int. Cl.² G11B 5/09, 15/02, 27/32
U.S. Cl. 360—62 **1 Claim**



1. For use with a magnetic tape, a rotating head tape recorder having a rotor for rotating in a first sense and with a recording head closely followed by a readback head for use with an elongate record medium having a leading longitudinal edge crossed first by said heads in close succession with one servo track spaced from said leading edge a distance corresponding to said close spacing of said heads with signals recorded on both sides of said servo track transversely to the elongation of the record medium,

the improvement including in combination:

signal recording circuits;

servo circuits for exercising control over said recorder to position a tape in said recorder;

signal readback circuits electrically connected to said readback head for receiving signals therefrom;

a tachometer means connected to said rotor for indicating rotational position thereof; and

a double-throw, single-pole, electronic switch means responsive to said rotational position indication to switch said recording head between said servo circuits and said recording circuits such that said recording head alternately senses said servo track and records signals respectively as said readback head senses signals intermediate said leading edge and said servo track and then senses signals recorded by said recording head,

said tachometer means includes a resettable digital electronic counter generating signal content representing rotor position by a digital count and supplying signals indicative of position including means supplying signals indicating scan of said servo track adjacent said reference edge,

said electronic switch means consisting of first and second AND circuits having one common connection to said

write head and respective individual connections to said signal recording circuits and said servo circuits and both said AND circuits receiving said servo track signals for alternately switching said write head between said servo circuits and said signal recording circuits, and

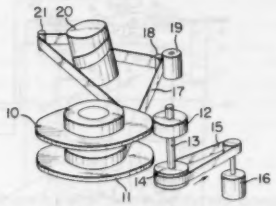
said signal readback circuits connected to said resettable digital electronic counter for selectively processing signals received from said readback head.

4,011,588

ROTARY HEAD TYPE MAGNETIC TAPE VIDEO RECORDING-REPRODUCING DEVICE

Fujio Yasuda; Teruo Saito, and Mamoru Hiroyasu, all of Saijyo, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed May 22, 1975, Ser. No. 579,859
Claims priority, application Japan, May 30, 1974, 49-61108
Int. Cl.² G11B *15/43*
U.S. Cl. 360—71 **5 Claims**



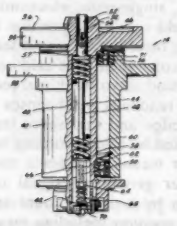
1. A rotary head type magnetic tape video recording-reproducing device of the type wherein a magnetic tape is transported to and from and is wrapped at least one turn around a rotary member carrying at least one rotary magnetic head along a path of revolution thereof at an angle other than 0° relative to the axis of rotation of said rotary member for sequentially recording information upon said magnetic tape or reproducing information therefrom during transport of the tape, and wherein one end of said magnetic tape is wrapped around a supply reel and the other end thereof wrapped around a take-up reel, means including a power supply for selectively driving one of said reels, the improvement wherein means are provided responsive to the interruption of said power supply for reversing the direction of said selected driven reel through a predetermined angle.

4,011,589

SPINDLE LOCK SHAFT FOR DISK DRIVE MEDIA

Louis G. Gitzendanner, Oklahoma City, Okla., assignor to Honeywell Information Systems, Inc., Waltham, Mass.

Continuation of Ser. No. 474,575, May 30, 1974, abandoned.
This application Jan. 23, 1976, Ser. No. 651,677
Int. Cl.² G11B *5/012*; G01D *15/16*; F16C *1/02*
U.S. Cl. 360—98 **4 Claims**



1. In a disk drive apparatus having a disk pack with a motor driven spindle for rotating the disk pack, said disk pack including a mounting plate located at the bottom thereof and bearing upon the top of said motor driven spindle, said motor driven spindle comprising:

a spindle housing having a hollow interior chamber with an inwardly extending flanged portion at the top thereof;

a shaft disposed within the hollow interior chamber of said spindle housing and secured to the mounting plate, said shaft having a top portion, a bottom portion and a mid portion, the mid portion having a diameter smaller than the top portion and the bottom portion; and

means for spring loading said shaft within the hollow interior chamber of said spindle housing, said spring-loading means comprising:

a first spring extending along the length of only the mid portion of said shaft, said first spring being compressibly loaded against the inwardly extending flanged portion at the top of the hollow interior chamber of said spindle housing so as to bias said shaft downwardly,

a second spring extending over only the bottom portion of said shaft, said second spring compressibly loaded against the bottom of the hollow interior of said spindle housing so as to bias said shaft upwardly, and

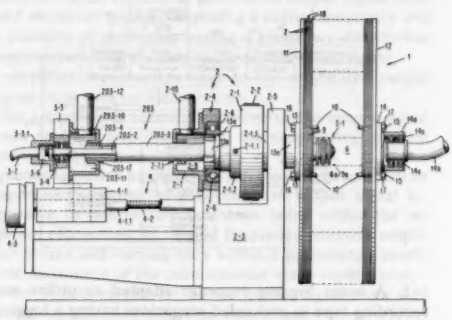
means, located at the bottom of said first spring and the top of said second spring, for compressible loading said first and second springs within the hollow interior chamber of said spindle housing.

4,011,590

INTERNAL DIVISION ACTUATION OF VENTILATED FLOPPY DISK STACK

Anthony W. Orlando, Highland, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 4, 1975, Ser. No. 628,623
Int. Cl.² G11B *5/82, 5/54, 25/04*
U.S. Cl. 360—99 **10 Claims**



1. Access actuation apparatus for sustainably separating normally inaccessible storage surfaces of flexible disks arranged in a rotating stack confined by inflexible end plates, successive said disks being nominally spaced by radially porous spacers, said stack encompassing a partially vacant space extending through all of said disks and spacers, said apparatus comprising:

pressure transmittal means extending slidably into and partially filling said vacant space; and means having an enlarged hub section filling a portion of said space and effectively partitioning said space into at least partially vacant first and second sub-spaces; said means having an enclosed first pressure transmittal channel extending between said hub section and the exterior of said stack; said hub section having a narrow opening connected with said first channel and a cross channel construction isolated from said first channel for connecting vacant portions of of said first and second sub-spaces; and

means for variably pressuring said first channel and said

vacant portion of at least one of said sub-spaces to cause sustainable split displacement effects relative to said storage surfaces by which said surfaces are rendered selectively accessible for storage transducing operations.

4,011,591

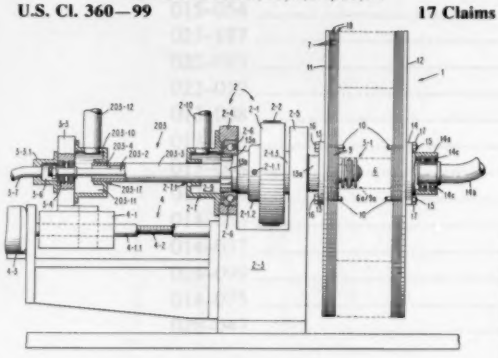
INTERNAL DIVISION ACTUATION OF VENTILATED FLOPPY DISK STACK

Anthony W. Orlando, Highland, and James A. Weidenhammer, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 4, 1975, Ser. No. 628,622

Int. Cl.² G11B *5/82, 5/54, 25/04*

U.S. Cl. 360—99 **17 Claims**



1. In a random access disk file data storage system comprised of multiple flexible disks arranged for co-rotation in a stack configuration, said disks having displaceably interfacing storage surfaces which are ordinarily spaced at intervals too narrow for transducing access, a method of providing storage transducing to said surfaces on a random selection basis comprising:

supplying an outward ventilation flow of air under pressure to said intervals between all of said surfaces through a common space encompassed by the rotation of said surfaces;

directing an intermittent increment of outward flow through said of said intervals;

selecting said one interval variably on a said common space to a selected one selection basis; and

controlling the displacements of said surfaces due to said increment of additional air flow to form a stable split opening encompassing said one interval and rendering the surfaces facing said one interval accessible for storage transducing operations.

4,011,592

CASSETTE TAPE RECORDER WITH TAPE PAD

Takehiko Kawada, Yokohama, Japan, assignor to Denki Onkyo Company, Ltd., Tokyo, Japan

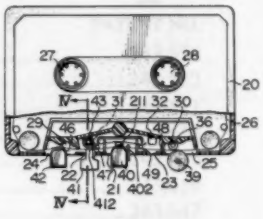
Filed Apr. 29, 1975, Ser. No. 572,896

Claims priority, application Japan, Apr. 30, 1974, 49-49184; May 10, 1974, 49-52493; May 25, 1974, 49-58977; May 24, 1974, 49-59533[U]; May 24, 1974, 49-59535[U]; May 24, 1974, 49-59536[U]; May 25, 1974, 49-60152[U]; June 20, 1974, 49-72831[U]; June 21, 1974, 49-72950[U]; June 21, 1974, 49-72951[U]

Int. Cl.² G11B *23/04, 15/29, 15/60*

U.S. Cl. 360—130 **15 Claims**

1. A cassette tape recorder for use with a tape cassette for containing a magnetic tape, the cassette being formed in its front end face with a central window in which an internal tape pad is provided and with a pair of smaller windows and a pair of larger windows which are disposed symmetrically with respect to the central window, the respective windows exposing a portion of the magnetic tape, the cassette further including an upper and a lower wall in which are formed a pair of position control apertures corresponding to the smaller windows, a pair of capstan holes corresponding to the larger windows and a pair of reel openings in which spools for taking up the magnetic tape are disposed therein; the recorder comprising a capstan shaft adapted to be inserted into at least one of the capstan holes in the cassette during use of the cassette, a pinch roller adapted to be inserted into one of the larger windows which corresponds to the capstan hole in which the



capstan shaft is inserted, for cooperating with the capstan shaft to cause the magnetic tape to run, a first magnetic head adapted to be inserted into the central window in the cassette for contact with the magnetic tape, at least second magnetic head adapted to be inserted into one of the remaining windows in the cassette, and a tape pad means mounted in the recorder for insertion into the aperture or hole which corresponds to the window other than the central window into which said second magnetic head is inserted for urging the magnetic tape against the second magnetic head.

4,011,593

MAGNETIC TAPE CASSETTE WITH SCREENING SHIELD

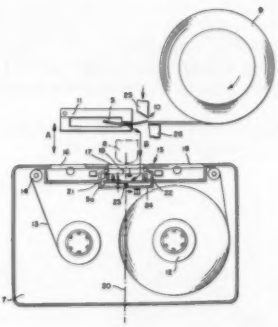
Dieter Gaiser, Diersheim; Eberhard Koester, Frankenthal; Klaus Schoettle, Ludwigshafen, and Friedrich Guenther, Willstaett, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation-in-part of Ser. No. 462,530, April 19, 1974, abandoned. This application Apr. 23, 1975, Ser. No. 570,519

Claims priority, application Germany, Apr. 21, 1973, 2320439

Int. Cl.² G11B *23/04, 15/60*

U.S. Cl. 360—132 **8 Claims**



1. A magnetic tape cassette, especially a compact cassette, comprising lower and upper cassette housing parts having side

walls, the front wall being provided with an entry aperture for a magnetic head associated with a recording/playback apparatus and, facing this aperture, a screening shield secured in the cassette housing by holding means, wherein the screening shield is in the form of an arcuately shaped strip of resiliently deformable "soft" magnetic material, and wherein there are provided means, including said holding means, which incident to the insertion of the strip into the cassette housing flex said strip into a shape of reduced arcuity and after said insertion hold the strip in the last-mentioned shape under flexural stress, said holding means comprising members bearing against two longitudinally spaced portions of said strip from one side and against a portion of said strip intermediate said spaced portions from the other side.

DESIGN PATENTS

GRANTED MARCH 8, 1977

ERRATA

For CLASS	See PATENT NO.
015–054	243,574
023–127	243,582
022–019	243,611
022–019	243,612
013–008	243,615
013–008	243,616
013–008	243,617
013–008	243,618
014–053	243,619
014–037	243,620
024–099	243,628
014–075	243,630
028–047	243,638

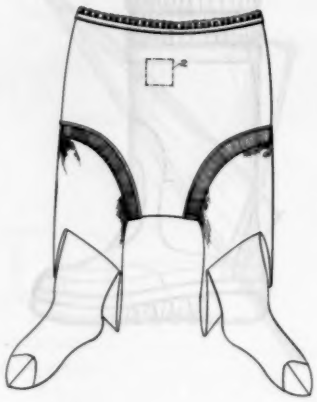
DESIGN PATENTS

GRANTED MARCH 8, 1977

ERRATA

Des. PATENT NO.	Sec. PATENT NO.
013-054	243,274
022-127	243,762
022-019	243,811
022-019	243,812
013-008	243,815
013-008	243,816
013-008	243,817
013-008	243,818
014-023	243,819
014-027	243,820
024-099	243,821
014-073	243,824
014-073	243,830
028-047	243,838

243,561
PANTYHOSE
Teresita E. Alvarez, New York, N.Y., assignor to Burlington Industries, Inc., Greensboro, N.C.
Filed Feb. 7, 1975, Ser. No. 548,173
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—6



243,562
WOMAN'S TWO-PIECE BATHING SUIT
William H. Kruse, 1430 Kendall St., No. 915, Lakewood, Colo. 80214
Filed Mar. 10, 1975, Ser. No. 556,571
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—37

243,563
HEAD COVERING
Betty C. Kreisel, 5440 Lindley Ave., Apt. 106, Encino, Calif. 91316
Filed June 11, 1975, Ser. No. 586,047
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—243

243,564
HEAD COVERING
Betty C. Kreisel, 5440 Lindley, Apt. No. 106, Encino, Calif. 91316
Filed Aug. 20, 1975, Ser. No. 606,020
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—243

243,565
ORNAMENTAL DESIGN FOR A BOOT
Guy Charles de Massacre, 124, Avenue des Champs-Elysees, Paris (Seine), France
Filed Aug. 26, 1975, Ser. No. 607,872
Claims priority, application France, Feb. 28, 1975, 75.37974
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—272

243,567
BOOT
Guy de Massacre, 124, avenue des Champs-Elysee, Paris, France
Filed Oct. 20, 1975, Ser. No. 624,164
Claims priority, application France, June 9, 1975, 75.359
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—272

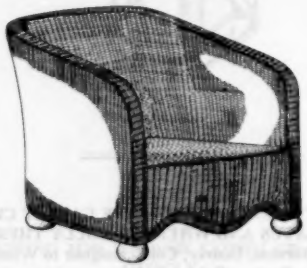
243,566
BOOT
Guy de Massacre, 124, avenue des Champs-Elysee, Paris, France
Filed Oct. 20, 1975, Ser. No. 624,163
Claims priority, application France, June 9, 1975, 75.359
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—272

243,568
TOOTH BRUSH
Per Axel Torbjörn Axelsson, Drottninggatan 27, 652 25 Karlstad, Sweden
Filed Dec. 4, 1974, Ser. No. 529,591
Claims priority, application Sweden, June 12, 1974, 74979
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—25

243,569
BABY CARRIER
Robert K. Lieding, 348 Wilson Ave., and Richard E. Cone, 249 Bowman Drive, both of Kent, Ohio 44240
Filed Sept. 17, 1975, Ser. No. 614,139
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—7

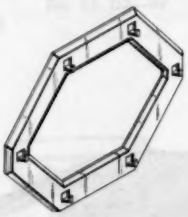
243,570
CHAIR
Richard F. Laurenzi, 620 Vanderbilt Ave., Brooklyn, N.Y. 11238
Filed Oct. 15, 1975, Ser. No. 622,691
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—7

243,571
WICKER CHAIR
John B. Wisner, New York, N.Y., assignor to Ficks Reed Company, Cincinnati, Ohio
Filed June 16, 1975, Ser. No. 587,078
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—57

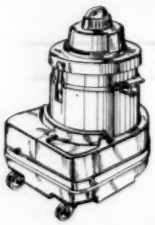


243,572
CHAIR
Giovanni Offredi, Milan, Italy, assignor to Fratelli Saporiti, Besnate (Varese), Italy
Filed Mar. 18, 1975, Ser. No. 559,523
Claims priority, application Italy, Sept. 19, 1974, 60916/74
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—75

243,573
MEASURING CUP RACK
Charles Martin Flaherty, Casselberry, Fla., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Feb. 13, 1976, Ser. No. 657,797
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—114

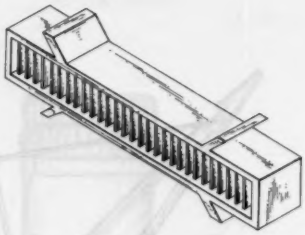


243,574
HOT WATER EXTRACTION-TYPE CARPET CLEANING APPARATUS AND WHEELED DOLLY THEREFOR
Robert N. Bartlett, Denver, Colo., assignor to Windsor Industries, Inc., Denver, Colo.
Filed July 16, 1975, Ser. No. 596,296
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D15—54

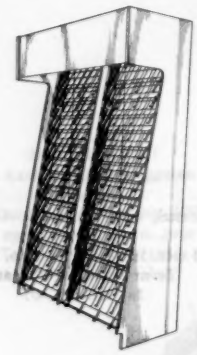


243,575
STAND FOR A TELEPRINTER
John E. Knox, Eisental, Affental, Germany, assignor to International Standard Electric Corporation
Filed July 10, 1975, Ser. No. 594,816
Claims priority, application Germany, Jan. 17, 1975, 4262
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—181

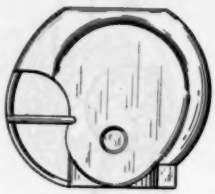
243,576
TAPE STORAGE RACK
Richard Zinck, 29-24 164th St., Flushing, N.Y. 11358
Filed Dec. 23, 1975, Ser. No. 643,743
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—185

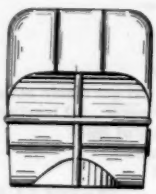


243,577
DISPLAY RACK FOR CARPET SAMPLES OR THE LIKE
Gerard M. Schouten, Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.
Filed May 15, 1975, Ser. No. 577,641
U.S. Cl. D6—188



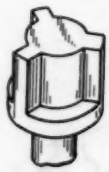
243,578
DRINKING MUG
Alfred W. Danat, 2114 Villaret Drive SW., Huntsville, Ala. 35803
Filed Mar. 7, 1975, Ser. No. 556,216
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—5





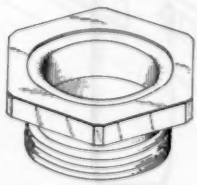
243,579
PITCHER OR SIMILAR ARTICLE
Frank J. Benes, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Division of Ser. No. 549,529, Feb. 13, 1975, which is a division of Ser. No. 397,069, Sept. 13, 1973, Pat. No. Des. 238,541. This application Apr. 28, 1976, Ser. No. 681,127
U.S. Cl. D7—64

243,580
FASTENER
Charles J. DeCaro, Marshfield, Mass., assignor to Textron, Inc.
Filed May 8, 1975, Ser. No. 575,783
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—388



243,581
GUIDE SPRING FOR WINDOW SASHES OR SIMILAR ARTICLE
Lorane C. Goss, Jr., Dillsburg; James T. Cribben, Mechanicsburg, and Joseph J. Miller, Plainfield, all of Pa., assignors to Capitol Products Corporation, Mechanicsburg, Pa.
Filed Apr. 15, 1974, Ser. No. 460,694
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—395

243,582
SCREW PLUG MOUNTING FOR AN ELECTRIC IMMERSION HEATER
Robert D. Shirey, 207 Ennerdale Drive, Pittsburgh, Pa. 15208
Filed July 10, 1975, Ser. No. 594,851
Term of patent 14 years
Int. Cl. D08—*08*
U.S. Cl. D23—127



243,583
PLASTIC SLEEVE-ENCASED BOTTLE
Raymond G. Reynolds, Sylvania, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Continuation-in-part of Ser. No. 566,272, April 9, 1975. This application May 7, 1975, Ser. No. 575,296
The portion of the term of this patent subsequent to Mar. 8, 1992, has been disclaimed.
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—12

243,584
BOTTLE
Raymond G. Reynolds, Sylvania, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed Apr. 9, 1975, Ser. No. 566,272
The portion of the term of this patent subsequent to May 25, 1993, has been disclaimed.
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—119

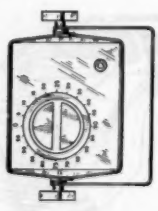
243,585
COMBINED BOTTLE AND CLOSURE
John D. Angleman, Brookside, N.J., and Doris DuCret, New York, N.Y., assignors to Bristol-Myers Company, New York, N.Y.
Filed Jan. 9, 1975, Ser. No. 539,754
Claims priority, application Australia, Jan. 22, 1974, 6324/74
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—147

243,586
CLOCK
Toshihiro Araki, Osaka, Japan, assignor to Japan Suncrux Co., Ltd., Japan
Filed May 12, 1975, Ser. No. 576,261
Claims priority, application Japan, Nov. 12, 1974, 49-39559; Jan. 30, 1975, 50-3988
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—15

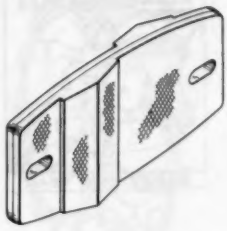
243,587
PENDANT WATCH
Shelton Shiu-Tong Ho, Hong Kong, assignor to Excelco International Inc., Waverly, Minn.
Filed July 28, 1975, Ser. No. 599,543
Claims priority, application United Kingdom, June 5, 1975, 971354/75
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—30

243,588
WRIST WATCH
Shelton Shiu-Tong Ho, Hong Kong, assignor to Excelco International Inc., Waverly, Minn.
Filed July 28, 1975, Ser. No. 599,544
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—33

243,589
SONAR UNIT FOR FISHERMEN
John C. Moore, Tulsa, Okla., assignor to Lowrance Electronics, Inc., Tulsa, Okla.
Filed June 9, 1975, Ser. No. 584,775
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—46



243,590
BICYCLE REFLECTOR
Nicholas A. Amoroso, Hillsdale, N.J., assignor to Bright Star Industries, Inc., Clifton, N.J.
Filed Aug. 8, 1975, Ser. No. 602,970
The portion of the term of this patent subsequent to Oct. 28, 1989, has been disclaimed.
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—111

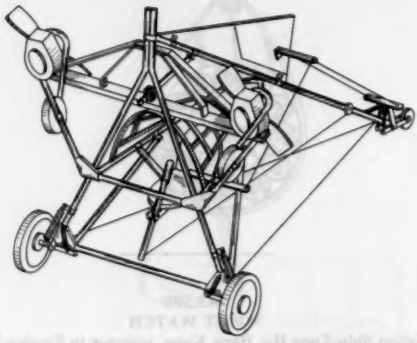


243,591
PANEL FOR DISPLAY OF TIME OR FREQUENCY, OR BOTH
Howard Alan Taishoff, 105 Oxford Blvd., Great Neck, N.Y. 11023
Filed July 28, 1975, Ser. No. 600,103
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—125

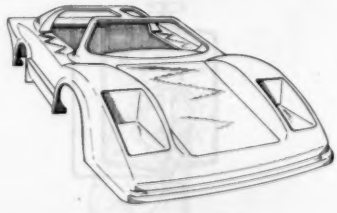
243,592
CHRISTMAS WALL HANGING
Helen L. Taber, 63 W. Saddle River Road, Saddle River, N.J. 07458
Filed Nov. 1, 1974, Ser. No. 519,957
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—121

243,593
MULTIPURPOSE KNOCKDOWN HANDCART
Harvey J. Smith, Sr., 1211 Buckingham Road, and John T. Lipford, 303 Sunset Drive, both of Greensboro, N.C. 27408
Filed Aug. 22, 1975, Ser. No. 606,758
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—34

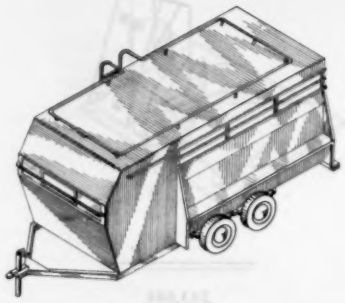
243,594
SELF-PROPELLED HANG GLIDER CARRIAGE
Jeffrey F. Koch, P.O. Box 453, Petaluma, Calif. 94952
Filed Oct. 6, 1975, Ser. No. 619,667
Term of patent 14 years
Int. Cl. D12—*07*
U.S. Cl. D12—81



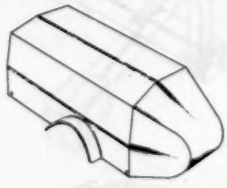
243,595
AUTOMOBILE BODY
Frederick W. Belz, 3824 Gordon Ave., Fort Worth, Tex. 76110
Filed July 7, 1975, Ser. No. 593,768
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—92



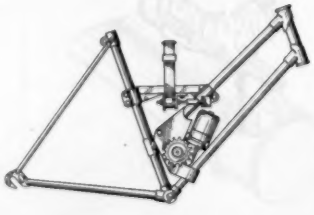
243,596
LIVESTOCK TRAILER
Nick Ksenych, 1130 Skyline Drive, Watertown, S. Dak. 57201
Filed Feb. 20, 1976, Ser. No. 660,040
Term of patent 14 years
Int. Cl. D12—*10*
U.S. Cl. D12—102



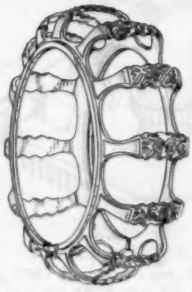
243,597
MOTORCYCLE CAMPER HOUSING
Marion Leon Headington, Jr., 1125 W. Orange Grove, Burbank, Calif. 91502
Filed Feb. 13, 1976, Ser. No. 657,946
Term of patent 14 years
Int. Cl. D12—*10*
U.S. Cl. D12—103



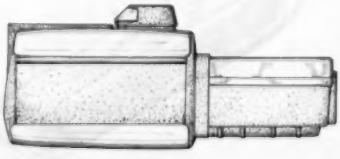
243,598
BICYCLE FRAME
Charles Patrick Duncan Davidson, Droitwich, England, assignor to Joseph Lucas Limited, Birmingham, England
Filed July 22, 1975, Ser. No. 598,021
Claims priority, application United Kingdom, Jan. 28, 1975, 969612/75
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—111



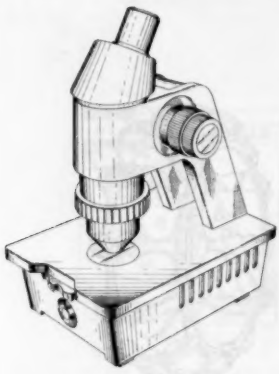
243,599
VEHICLE TIRE TRACTION DEVICE
Harry M. Gilmartin, 10460 SE. 22nd, Bellevue, Wash. 98004
Filed July 31, 1975, Ser. No. 600,914
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—154

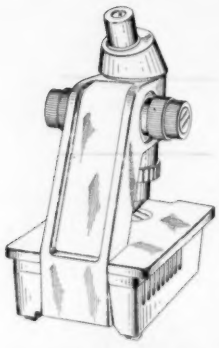


243,600
TELEVISION CAMERA
Hans Erich Slany, Esslingen, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany
Filed July 25, 1974, Ser. No. 491,866
Claims priority, application Germany, Jan. 26, 1974, 668
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—1

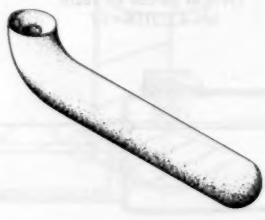


243,601
MICROSCOPE
Arthur B. Leeming, Sr., Rochester, and Edwin A. Speaker, Brockport, both of N.Y., assignors to Bausch & Lomb Incorporated, Rochester, N.Y.
Filed Feb. 17, 1976, Ser. No. 658,783
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—57

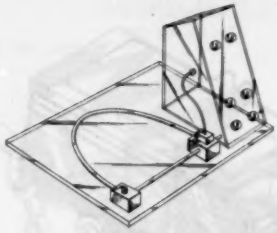




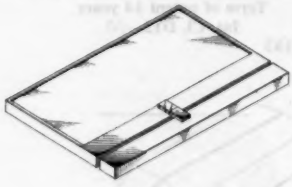
243,602
CONTACT LENS HANDLING DEVICE
Edward R. Updegraff, 6090 Montgomery Court, San Jose, Calif. 95135
Filed Nov. 6, 1975, Ser. No. 629,252
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—83



243,603
EDUCATIONAL CHROMATOGRAPH
John P. Salsgiver, 29 Ethan Allen Drive, Acton, Mass. 01720
Filed Sept. 13, 1974, Ser. No. 505,856
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—62



243,604
LIST FINDER
Mel Evenson, Santa Monica, Calif., assignor to Eldon Industries, Inc., Hawthorne, Calif.
Filed Jan. 16, 1975, Ser. No. 541,425
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—76

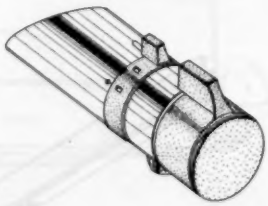


243,605
FISHING LURE
Frank Howard Shewmake, Rte. 3, Box 878, Plaquemine, La. 70764
Filed Aug. 6, 1975, Ser. No. 602,317
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

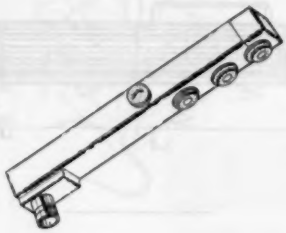
243,606
BOW STRING CABLE FITTING
John A. Carlson, Wichita, Kans., assignor to Conchemco, Incorporated, Lenexa, Kans.
Filed Dec. 22, 1975, Ser. No. 643,367
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—99

243,607
SPOUT
Rune G. Monö, Nasbyvagen 3, 183 30 Taby, and Michele Morichetto, Mollagatan 36, 502 46 Boras, both of Sweden
Filed Aug. 25, 1975, Ser. No. 607,597
Claims priority, application Sweden, Feb. 25, 1975, 75417; Feb. 25, 1975, 75418; Feb. 25, 1975, 75419
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—32

243,608
FAUCET
Rune G. Monö, Nasbyvagen 3, 183 30 Taby, and Michele Morichetto, Mollagatan 36, 502 46 Boras, both of Sweden
Filed Aug. 25, 1975, Ser. No. 608,506
Claims priority, application Sweden, Feb. 25, 1975, 75421
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—23

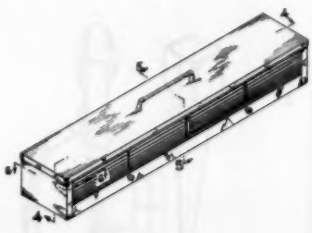


243,609
HANDSHOWER
Rune G. Monö, Nasbyvagen 3, 183 30 Taby, and Michelle Morichetto, Mollagatan 36, 502 46 Boras, both of Sweden
Filed Aug. 25, 1975, Ser. No. 607,598
Claims priority, application Sweden, Feb. 25, 1975, 75420
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—35

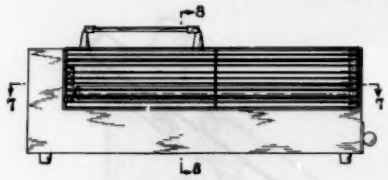


243,610
WATER SWEEPER
Randall T. Craig, 1907 Stonewall Lane, Vista, Calif. 92083
Filed Dec. 12, 1975, Ser. No. 640,060
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—35

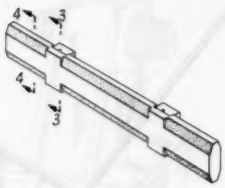
243,611
LIGHT ATTRACTING INSECT ELECTROCUTOR
Donald E. Gilbert, Box 2188, Jonesboro, Ark. 72401
Filed Dec. 8, 1975, Ser. No. 638,801
Term of patent 7 years
Int. Cl. D22—*06*
U.S. Cl. D22—19



243,612
ELECTRIC CONTROL UNIT FOR FLYING INSECTS
Donald E. Gilbert, Box 2188, Jonesboro, Ark. 72401
Filed Jan. 7, 1976, Ser. No. 647,083
Term of patent 7 years
Int. Cl. D22—*06*
U.S. Cl. D22—19

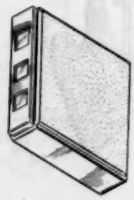


243,613
RETAINING WALL STRINGER
William K. Hilfiker, Eureka, Calif., assignor to Hilfiker Pipe Co., Eureka, Calif.
Filed Feb. 6, 1976, Ser. No. 655,888
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—77



243,614
STAKE
Michael T. Russo, 1805 Larchwood St., Troy, Mich. 48084
Continuation of Ser. No. 471,404, May 20, 1974, Pat. No. D240,362. This application Nov. 3, 1975, Ser. No. 627,907
Term of patent 14 years
Int. Cl. D25—*77*
U.S. Cl. D25—77

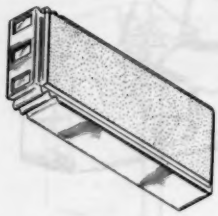
243,615
ELECTRIC BATTERY
Gordon E. Kaye, Garrison, N.Y., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.
Filed Aug. 13, 1975, Ser. No. 604,381
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D13—8



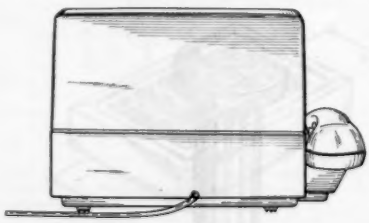
243,616
ELECTRIC BATTERY
Gordon E. Kaye, Garrison, N.Y., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.
Filed Aug. 13, 1975, Ser. No. 604,382
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D13—8

243,617
ELECTRIC BATTERY
Gordon E. Kaye, Garrison, N.Y., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.
Filed Aug. 13, 1975, Ser. No. 604,383
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D13—8

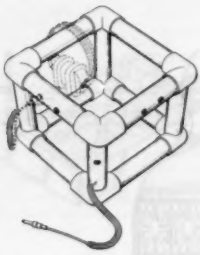
243,618
ELECTRIC BATTERY
Gordon E. Kaye, Garrison, N.Y., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.
Filed Aug. 13, 1975, Ser. No. 604,287
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D13—8



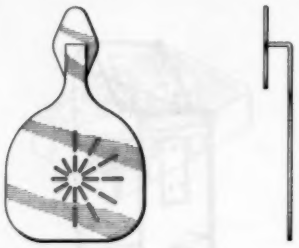
243,619
TELEPHONE INSTRUMENT
Karl Axel Torbjörn Olsson, Stockholm, Sweden, assignor to Telefonaktiebolaget, Stockholm, Sweden
Filed Mar. 12, 1975, Ser. No. 557,684
Claims priority, application Sweden, Oct. 4, 1974, 7400161
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53



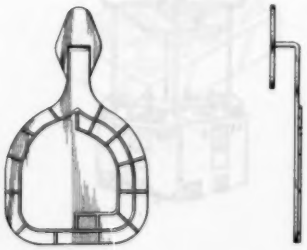
243,620
LISTENING CENTER
Jack H. Williams, 3229 W. Pioneer Drive, Irving, Tex. 75061
Filed Sept. 17, 1975, Ser. No. 614,331
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—37



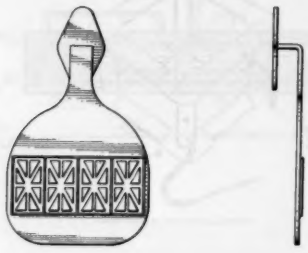
243,621
EAR TAG
Jay R. Sulik, Carrolton, Tex., assignor to Zoecon Industries, Inc., Dallas, Tex.
Filed June 17, 1974, Ser. No. 480,290
Term of patent 14 years
Int. Cl. D30—*08*
U.S. Cl. D30—43



243,622
EAR TAG
Ronald L. Burke, Denton, and Jay R. Sulik, Carrolton, both of Tex., assignors to Zoecon Industries, Inc., Dallas, Tex.
Filed Oct. 24, 1974, Ser. No. 517,588
Term of patent 14 years
Int. Cl. D30—*08*
U.S. Cl. D30—43



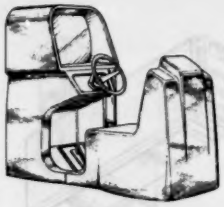
243,623
EAR TAG
Lee-Louise H. Priest, Atherton, Calif., assignor to Zoecon Industries, Inc., Dallas, Tex.
Filed Jan. 9, 1975, Ser. No. 539,796
Term of patent 14 years
Int. Cl. D30—*08*
U.S. Cl. D30—43



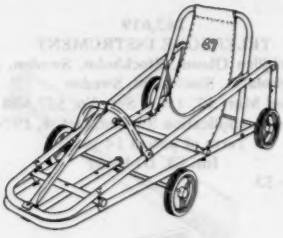
243,624
GAME CABINET
Peter L. Takaichi, San Jose, Calif., assignor to Atari, Inc.
Filed Oct. 20, 1975, Ser. No. 623,804
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 J

243,625
GAME CABINET
Kenneth W. Sauter, Morgan Hill, Calif., assignor to Atari, Inc.
Filed Oct. 20, 1975, Ser. No. 623,805
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 J

243,626
GAME CABINET
Regan L. Cheng, San Jose, Calif., assignor to Atari, Inc.
Filed Oct. 20, 1975, Ser. No. 623,806
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 J

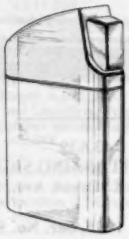


243,627
CHILD'S COASTER VEHICLE
Robert E. Clower, 1036 Elmwood Ave., Evanston, Ill. 60202
Filed Sept. 22, 1975, Ser. No. 615,712
Term of patent 14 years
Int. Cl. D21—*01*; D12—*14*
U.S. Cl. D34—15 AJ



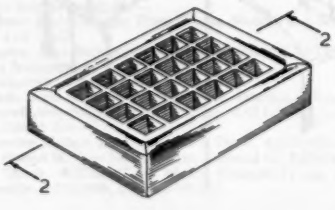
243,628
DISPOSABLE CAPSULE FOR SEPARATELY STORING COMPONENTS OF DENTAL AMALGAMS
Joseph G. Biondo, Watchung, N.J., assignor to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.
Filed Aug. 1, 1975, Ser. No. 601,220
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—99

243,629
LAMP
Alfred Brych, Romainville, France, assignor to Saft-Societe des Accumulateurs Fixes et de Traction, Paris, France
Division of Ser. No. 356,046, April 30, 1973, abandoned. This application June 12, 1975, Ser. No. 586,268
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 A

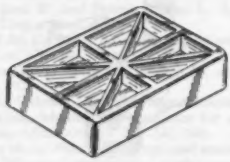


243,630
RADIO RECEIVER
Tsutomu Murakami, Neyagawa; Toshio Igo, Katano; Ken Kawamura, Ibaragi; Katsuhiko Makino, Hirakata; Hironosuke Koda, Kyoto, and Shinzo Murakami, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed May 7, 1975, Ser. No. 575,547
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—75

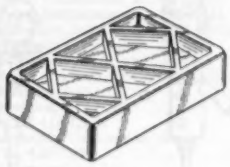
243,631
SOAP BAR
David J. Morrison, 1402 S. 78th St., Omaha, Nebr. 68127
Filed May 19, 1975, Ser. No. 578,375
Term of patent 14 years
Int. Cl. D28—*02*
U.S. Cl. D73—1 A



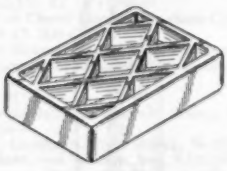
243,632
SOAP BAR
David J. Morrison, 1402 S. 78th St., Omaha, Nebr. 68124
Filed Sept. 2, 1975, Ser. No. 609,409
Term of patent 14 years
Int. Cl. D28—*02*
U.S. Cl. D73—1 A



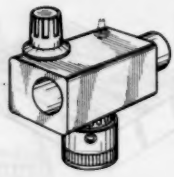
243,633
SOAP BAR
David J. Morrison, 1402 S. 78th St., Omaha, Nebr. 68127
Filed Sept. 22, 1975, Ser. No. 615,341
Term of patent 14 years
Int. Cl. D28—*02*
U.S. Cl. D73—1 A



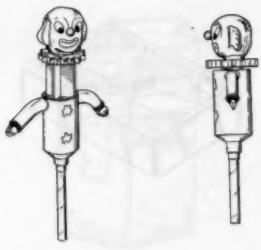
243,634
SOAP BAR
David J. Morrison, 1402 S. 78th St., Omaha, Nebr. 68124
Filed Sept. 22, 1975, Ser. No. 615,399
Term of patent 14 years
Int. Cl. D28—*02*
U.S. Cl. D73—1 A



243,635
PRESSURE RELIEF VALVE FOR RESPIRATORY INHALATION SYSTEMS
Bruce B. Miller, 714 Ashley Drive, Kalamazoo, Mich. 49001
Filed July 23, 1975, Ser. No. 598,544
Term of patent 14 years
Int. Cl. D29—*02*
U.S. Cl. D83—1 L



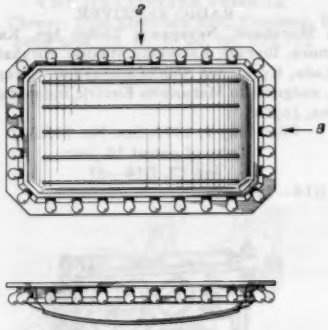
243,636
MEDICAMENT DISPENSER FOR CHILDREN
Stuart C. Rubin, 3141 E. Sunset Hill Drive, West Covina, Calif. 91790, and Gilbert I. Martin, 222 Starglen, Covina, Calif. 91722
Filed Feb. 23, 1976, Ser. No. 660,504
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D83—12 A



243,637
VACUUM BOTTLE TOTE BAG
Harold Rabinowitz, Lakewood, N.J., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed July 31, 1975, Ser. No. 600,701
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R

243,638
SAFETY RAZOR BLADE ASSEMBLY
Norman D. Poisson, Andover, Mass., assignor to The Gillette Company, Boston, Mass.
Continuation-in-part of Ser. No. 576,251, May 12, 1975, abandoned. This application June 11, 1976, Ser. No. 695,300
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—47

243,639
BEZEL FLASHING SIGN
Conrad J. Escalante, 852 E. Ocean Ave., Long Beach, Calif. 90802
Filed Apr. 14, 1975, Ser. No. 567,610
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 R



243,640
ROTARY ADVERTISING DISPLAY
John J. Casparro, 23326 Sandalwood St., Canoga Park, Calif. 91304
Filed May 21, 1976, Ser. No. 688,541
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D96—12 R

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TO WHOM

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A. Stephan U. Sohne GmbH & Co.: *See—*
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Adler, Alan J., 4,011,551.
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Adams, Thomas C. Interlock system for emergency vehicles. 4,010,814, Cl. 180-82.00R.
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Addressograph Multigraph Corporation: *See—*
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Aggen, Alvin F. Automatic seed planting machine and method for planting seeds in planters. 4,010,778, Cl. 141-9.000.
Aggen, Glenroy Newcomb, to Tecumseh Products Company. Method for fastening ceramic magnets to a flywheel using centrifugal force. 4,011,120, Cl. 156-74.000.
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Ahlen, Karl Gustav, to S.R.M. Hydromekanik Aktiebolag. Transmission including a hydrodynamic torque converter. 4,010,660, Cl. 74-688.000.
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Allyn, Jerome B.; Wileman, Richard D.; and Kozak, John, to Midland-Ross Corporation. Melting pot apparatus for use in a continuous casting process. 4,010,939, Cl. 266-242.000.
Althuis, Thomas H., to Pfizer Inc. Esters and amides of pyrimido[4,5-b]quinolin-4(3H)-one-2-carboxylic acids as antiulcer agents. 4,011,324, Cl. 424-251.000.
Alumax Inc.: *See—*
Stephens, Wilbur E., 4,010,935.
Alvarez, Cesar E., Jr., to Teletype Corporation. MOSFET detecting and synchronizing circuit for asynchronous digital data. 4,011,465, Cl. 307-208.000.
Amann, August; Vilhuber, Heinz Georg; Kunze, Johannes; Giertz, Hubert; and Franke, Albrecht, to BASF Aktiengesellschaft. 3-(p-Biphenylyl)-butyronitrile and therapeutic compositions containing the same. 4,011,336, Cl. 424-304.000.
Amann, August: *See—*
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American Can Company: *See—*
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Demchak, Richard Joseph; and Whitehead, David Lasilla, 4,011,062.
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Anderson, Fred N., to Cherry Electrical Products Corporation. Switch blade. 4,011,419, Cl. 200-67.00B.
Anderson, Leif Per Roland. Storage apparatus with slide assemblies and a transportation device with pivotal conveyor means. 4,010,856, Cl. 214-16.40A.
Anderson, Rodney H.: *See—*
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Andrzejewski, Heinz, to Draftex Development AG. Sealing or trimming strip structure. 4,010,573, Cl. 49-479.000.
Ansari, Hifzur Rahman; Fido, Paul Edgar; and Wagner, Horst Richard,

to Bush Boake Allen Limited. Chemicals and their use in perfumery. 4,011,177, Cl. 252-522.000.
Anthony, Thomas R.; and Cline, Harvey E., to General Electric Company. Process for making a deep diode atomic battery. 4,010,534, Cl. 29-572.000.
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Pearlman, Alan R.; and Gillette, Timothy C., 4,011,466.
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Arthur, David M. Solar radiation collector and system for converting and storing collected solar energy. 4,010,614, Cl. 60-641.000.
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Simpkin, Gordon Thomas; and Ashcroft, Kenneth, 4,011,359.
Ashcroft, Richard I., to Owens-Illinois, Inc. Method for producing plastic-covered containers. 4,011,122, Cl. 156-86.000.
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Jones, Rodney Vernon, 4,010,826.
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Babiol, Pierre, to Le Bouchage Mecanique. Pourer-stopper. 4,010,875, Cl. 222-517.000.
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Bauer, Herbert: *See*—
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Baumgartner, Franz, to Kretztechnik Gesellschaft m.b.H. Ultrasonic inspection method. 4,010,634, Cl. 73-67.80S.
Baur, Leslie L.; and Hajduk, Thaddeus J., to Zenith Radio Corporation. Method for assembling a funnel and a flangeless faceplate in the manufacture of a color television picture tube. 4,010,525, Cl. 29-25.130.
Baur, Willi: *See*—
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Bavis, Edward F. Conveyor system for drive-in banks and the like. 4,010,824, Cl. 186-1.00C.
Baxmann, Fritz; Dietrich, Johann; Dittmann, Walter; and Frese, Albert, to Chemische Werke Huls Aktiengesellschaft. Process for the production of crystalline terpolymers of ethene, butene-1 and butene-2. 4,011,384, Cl. 526-158.000.
Baxter, James Fletcher, to Du Pont de Nemours, E. I., and Company. Apparatus for continuous hot air bonding a nonwoven web. 4,011,124, Cl. 156-358.000.
Baxter Travenol Laboratories, Inc.: *See*—
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Beard, Colin C.; Edwards, John A.; and Fried, John H., to Syntex (U.S.A.) Inc. 7(8)-Substituted triazinobenzimidazoles and anthelmintic compositions and method. 4,011,320, Cl. 424-249.000.

Beard, Garry E., to Ford Motor Company. Signal generating mechanism. 4,011,476, Cl. 310-70.00R.

Beck, Alfred E., Jr.: *See*—
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Beck, Jacob Howard, to BTU Engineering Company. Electric furnace heater. 4,011,395, Cl. 13-25.000.

Beckman Instruments, Inc.: *See*—
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Becton, Dickinson and Company: *See*—
Smith, John A.; Miller, Jack H.; Schilling, Russell C.; and North, Howard L., Jr., 4,010,893.

Becton, Dickinson Electronics Company: *See*—
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Beecham Group Limited: *See*—
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Bell Telephone Laboratories, Incorporated: *See*—
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Levinstein, Hyman Joseph; and Sinha, Ashok Kumar, 4,011,583.

Beloit Corporation: *See*—
Oas, David C.; and Kmentt, Waldemar E., 4,011,039.

Belza, George S. Paint brush and the like. 4,010,510, Cl. 15-192.000.

Ben-Dov, Oded, to RCA Corporation. Circularly polarized, broadside firing, multihelical antenna. 4,011,567, Cl. 343-853.000.

Bendall, Wilfrid H. Marine propulsion unit. 4,010,707, Cl. 115-12.00R.

Bendix Corporation, The: *See*—
Betsill, Harry E.; Levin, Charles J.; and Vogt, Guilfred L., 4,011,499.
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Benes, Milan; and Peska, Jan, to Ceskoslovenska akademie ved. Quaternary salts of methacrylic or acrylic esters and cationic quaternay polyelectrolytes and ion exchange resins thereof. 4,011,204, Cl. 260-79.3MU.

Bennett, David F.: *See*—
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Bennett, Gene Lee, to Genio Tools, Inc. Interlock cutting tool holder. 4,011,026, Cl. 408-199.000.

Bennett, Robert A. Portable quiz responsive and display device. 4,010,553, Cl. 35-9.00C.

Bennett, Walter Scott, to Burroughs Corporation. Modular apparatus for accelerated generation of a quotient of two binary numbers. 4,011,439, Cl. 235-164.000.

Beranger, Serge: *See*—
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Berger, Abe; and Juliano, Peter C., to General Electric Company. Process for making polyimide-polydiorganosiloxane block polymers. 4,011,279, Cl. 260-824.00R.

Berger, Isaac: *See*—
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Berkenblit, Melvin; Chan, See Ark; Landermann, Joan B.; Reisman, Arnold; and Takamori, Takeshi, to International Business Machines Corporation. Method of controlling the softening point of solder glass. 4,011,060, Cl. 65-134.000.

Berle, Johannes; Dulken, Hartmut; Guder, Gottfried; and Kassel, Karl-Heinz, to Licentia Patent-Verwaltungs-G.m.b.H. Method for producing an electrophotographic recording material. 4,011,079, Cl. 96-1.500.

Bernardis, Francesco; and Bisone, Dario, to Ing. C. Olivetti & C., S.p.A. Wire printing device. 4,010,836, Cl. 197-1.00R.

Bertelli, Aldo, to Rorer Italiana S.p.A. Steroid derivatives. 4,011,317, Cl. 424-243.000.

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Betsill, Harry E.; Levin, Charles J.; and Vogt, Guilfred L., to Bendix Corporation, The. Low loss a.c. voltage regulator. 4,011,499, Cl. 323-43.50S.

Beyer, Horst; Buran, Ulrich; Dautzenberg, Norbert; and Hewing, Joseph, to Goetzewerke-Friedrich Goetze AG. Sinter material for sealing strips in rotary piston engines. 4,011,054, Cl. 29-182.700.

Bichet, Lucien, to Societe Immobiliere et Financiere Suchet Alfort S.I.F.S.A. Molding apparatus with material smoothing means and recycling means. 4,011,036, Cl. 425-217.000.

Biebuyck, Lawrence F.: *See*—
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Bihlmaier, Eugen, to Daimler-Benz Aktiengesellschaft. Hydropneumatic pressure storage device. 4,010,773, Cl. 138-30.000.

Bindra, Jasjit S.: *See*—
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Bliss Pendair Limited: *See*—
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Bliven, Thomas G. Structural frame - window pane assembly. 4,010,585, Cl. 52-308.000.

Blomqvist, Seppo Ilmari; Lilja, Launo Leo; Makitalo, Valto Johannes; Relander, John Henrik; Honkaniemi, Matti Ellas; and Tuovinen, Frans Heikki, to Outokumpu Oy. Method and device for dispersing a melt with a fluid jet. 4,011,290, Cl. 264-12.000.

Bloom, Everett E.; Stiegler, James O.; Rowcliffe, Arthur F.; and Leitnaker, James M., to United States of America, Energy Research and Development Administration. Austenitic stainless steel alloys having improved resistance to fast neutron-induced swelling. 4,011,133, Cl. 176-68.000.

Bloomfield, Samuel. Coin holder. 4,010,845, Cl. 206-.820.

Blount, David H. Process for the production of silicic acrylate compounds and resinous products. 4,011,253, Cl. 260-448.20E.

Bockenhoff, Hermann-Josef; Schaeffer, Walter; and Kranz, Berthold, to Arbed-F & G Drahtwerke Koln GmbH. Method and apparatus for forming and treating bundles of steel rods. 4,011,110, Cl. 148-12.00B.

Bodewig, Manfred. Apparatus for applying a soldering paste to discrete spots on components prior to soldering. 4,010,711, Cl. 118-211.000.

Boer, Gerard B. M., to Vitatron Medical B.V. Insulated, corrosion resistant medical electronic devices and method for producing same. 4,010,759, Cl. 128-419.00P.

Bohmer, Eberhard, to Klockner-Werke AG. Multi-partite guide roll. 4,010,528, Cl. 29-125.000.

Bollen, Lambertus Jacobus Maria; and Damen, Cornelus Petrus Theodorus Maria, to U.S. Philips Corporation. Photodiode. 4,011,578, Cl. 357-30.000.

Bombardier Limitee: *See*—
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Bonderman, Dean P. Turbidity reduction in triglyceride standards. 4,011,045, Cl. 23-230.00B.

Bonds, Kip M.: *See*—
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Bones, Roger John; and Harbar, John Richard, to United Kingdom Atomic Energy Authority. Electric cells. 4,011,366, Cl. 429-61.000.

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Bonfig, Karl Walter; Hofmann, Friedrich; Stelz, Wolfgang; and van der Pol, Ronald, to Ludwig Krohne K.G. Method for compensation of the electrochemical perturbing direct current potential in inductive flow measurement with a periodically switched uniform field. 4,010,644, Cl. 73-194.0EM.

Bonzack, Eugene P., to F. Jos. Lamb Company. Forked work-carrier conveyor mechanism. 4,010,841, Cl. 198-357.000.

Borg-Warner Corporation: *See*—
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Bormann, Alan Richard, to Motorola, Inc. Select line hold down circuit for MOS memory decoder. 4,011,549, Cl. 340-173.0CA.

Borsuk, Anatoly Nikolaevich. Axial-flow transsonic compressor. 4,011,028, Cl. 415-192.000.

Borsuk, Evgeny Grigorievich: *See*—
Pimshtein, Pavel Gdalievich; Shel, Marat Moiseevich; Khismatulin, Enver Rakhmatullovich; Borsuk, Evgeny Grigorievich; Novikov, Alexandr Nikolaevich; Makarov, Viktor Matveevich; Ziselman, Boris Grigorievich; Kuramzhin, Alexandr Valeryanovich; Usenko, Viktor Grigorievich; Glubin, Nikolai Kirillovich; and Ivantsov, Vladimir Viktorovich, 4,010,864.

Bothwell, Peter William. Motorcycle frame. 4,010,812, Cl. 180-33.00A.

Bouche, Raymond R. Vibration damper for high voltage cables. 4,011,397, Cl. 174-42.000.

Boudouris, Angelo; Petty, William D.; and Simonds, Clarence S., to Eprad Incorporated. Film supply and take-up system for motion picture projector. 4,010,910, Cl. 242-55.180.

Bouman, Willem J., to Richards-Wilcox of Canada Limited. Dockboards. 4,010,505, Cl. 14-71.300.

Boutroy, Marcel; and Neyret, Jacques, to Hydrelem SA. Jack-pump device. 4,010,609, Cl. 60-402.000.

Bow, Kenneth E.; and MacRae, James D., to Dow Chemical Company, The. Electrical insulation from lightly chlorinated, high bulk density olefin polymer. 4,011,379, Cl. 526-22.000.

Bowden, Ralph H. TV service triggered oscilloscope. 4,011,506, Cl. 324-121.00R.

Bowles, Ralph F.; and Hartvig, Arthur, to NCR Corporation. Change dispensing apparatus. 4,010,766, Cl. 133-4.00A.

Boyd, Jerry L., to McClusky, Stanley A. Apparatus for supplying boxes to a plurality of filling and weighing stations and removal of filled boxes thereof. 4,010,595, Cl. 53-55.000.

Boyd, Jerry Lyndell, to McClusky, Stanley A. Method for supplying boxes to a plurality of filling and weighing stations and removal of filled boxes thereof. 4,010,594, Cl. 53-35.000.

Boyen, Steven G. Foot-neck harness device. 4,010,744, Cl. 128-75.000.

Boyne, Leslie: *See*—
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BP Chemicals Limited: *See—*
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Bradshaw, Janice: *See—*
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Brasel, David F.: *See—*
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Bratzler, Karl; Doerges, Alexander; and Kriebel, Manfred, to Metallgesellschaft Aktiengesellschaft. Process of purifying gases produced by the gasification of solid or liquid fossil fuels. 4,011,066, Cl. 55-44.000.
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Brechbuhler, Fritz W., to Gebr. Zehtner AG (Armierungs-Unternehmung). Method for the manufacture of reinforcement members and member manufactured by the method. 4,010,586, Cl. 52-309.160.
Bredewater, John R.; and Thumudo, Mario F., Jr., to General Tire & Rubber Company, The. Ultraviolet irradiating apparatus. 4,011,456, Cl. 250-492.00R.
Brendel, Uwe; and Bucksch, Manfred, to Zahnradfabrik Friedrichshafen AG. Clutch assembly for planetary-gear trains. 4,010,833, Cl. 192-87.110.
Breuner, Gerald L. Autogyro having blade tip jets. 4,010,919, Cl. 244-17.210.
Bridwell, Robert A.: *See—*
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Briggs & Stratton Corporation: *See—*
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Bright, Clark I.: *See—*
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Britschgi, Robert H.; and Frinzel, Jerry C. Electrical outlet guard. 4,010,995, Cl. 339-45.00R.
Broadbent, Kenneth Joseph, to Titan Manufacturing Company Proprietary Limited, The. Rock bolting equipment. 4,010,806, Cl. 173-57.000.
Broadie, Wilson L. Device for dispensing the contents of a collapsible tube. 4,010,871, Cl. 222-93.000.
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Buck, George S., Jr.; and Russell, Roger, to Cotton Incorporated. Cotton packaging method and apparatus. 4,010,680, Cl. 100-152.000.
Bucksch, Manfred: *See—*
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Budd Company, The: *See—*
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Bulanchuk, William J., to Midland-Ross Corporation. Plug-in jack for electrical busways. 4,010,997, Cl. 339-75.00R.
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Burkhard, Hermann, to Sandoz Ltd. 3-Cyano or acyl-4-aryl-5-arylazo-6-hydroxypyridone-2 dyes. 4,011,208, Cl. 260-156.000.
Burley, David R., to Tile Council of America, Inc. Cementitious compositions containing magnesium compounds to provide sag resistance. 4,011,094, Cl. 106-93.000.
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Bush Boake Allen Limited: *See—*
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Butler & Law Incorporated: *See—*
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Buysman, Petrus Johannes, to U.S. Philips Corporation. Apparatus for etching a continuously moving thin metal strip. 4,011,123, Cl. 156-345.000.
Byk Gulden Lomberg Chemische Fabrik GmbH: *See—*
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C F Braun & Co: *See—*
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C. Hager & Sons Hinge Manufacturing Company: *See—*
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Campbell, John R. Waste receiver for dogs. 4,010,970, Cl. 294-19.00R.
Campbell, Rayburn J. Fish scaling device. 4,010,516, Cl. 17-66.000.
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Canadian Patents and Development Limited: *See—*
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Canon Kabushiki Kaisha: *See—*
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Cantrell, Ronald G.; and Katchka, Barron L., to Houdaille Industries, Inc. Impact resistant lightweight, low cost automobile bumpers and method of making same. 4,010,969, Cl. 293-98.000.
Carevic, Frank E.; and Labriola, Anthony, to FMC Corporation. Stabilized polyester resin and processes for making them. 4,011,196, Cl. 260-45.85B.
Carey, Patrick H., Jr., to Minnesota Mining and Manufacturing Company. Filter medium layered between supporting layers. 4,011,067, Cl. 55-354.000.
Carlson, Carl Edwin: *See—*
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Carlson, Robert G.: *See—*
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Carnahan, Garnett H. Adjustable pedestal. 4,010,926, Cl. 248-411.000.
Carrington, Richard Gardner, to I. P. Callison & Sons, Inc. Recrystallized menthol product and method of making. 4,011,270, Cl. 260-631.00R.
Carroll, Ronnie D.; Moore, Bernard S.; and Tretter, James R., to Pfizer Inc. 2-Phenyl-6-(1-hydroxy-2-t-butylaminoethyl)-4H-pyrido[3,2-d]-1,3-dioxin maleate and its use as an intermediate. 4,011,231, Cl. 260-296.00R.
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Chamberlin, Thomas A.; and Madison, Norman L., to Dow Chemical Company, The. Process of using oxazoline and/or oxazine-modified polymers. 4,011,160, Cl. 210-40.000.
Chambers, Donald R.: *See*—
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Chang, Hsu; Chen, Tien C.; and Lee, Share-Young, to International Business Machines Corporation. Pipelined universal bubble logic array. 4,011,461, Cl. 307-88.0LC.
Chang, Robert Wu-Lin, to Singer Company, The. Frequency-shift digital data link and digital frequency detection system. 4,011,511, Cl. 325-40.000.
Chapron, Claude, to U.S. Philips Corporation. Hall effect-switching device. 4,011,469, Cl. 307-278.000.
Charles F. Kettering Foundation: *See*—
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Chelin, Charles R., to Towmotor Corporation. Lift chain equalizing device. 4,010,825, Cl. 187-9.00R.
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Cherubim, Martin: *See*—
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Chibnik, Sheldon; and Otto, Ferdinand P., to Mobil Oil Corporation. Lubricant compositions containing metal complexes as detergents. 4,011,167, Cl. 252-42.700.
Ching-Tien, Pi. Ellipse drawing instrument. 4,010,546, Cl. 33-30.00R.
Chiyoda Chemical Engineering & Construction Co. Ltd.: *See*—
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Curry, Harold George; Attwood, Brian William; White, Derek Graham Walter; Christensen, John Mosgaard; and Kroyer, Karl Kristian Kobs, 4,011,034.
Christy, Charles A. Positive displacement vane type rotary pump. 4,011,033, Cl. 418-253.000.
Chu, Chin-Chiun, to Mobil Oil Corporation. Disproportionation of toluene. 4,011,276, Cl. 260-672.00T.
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Clark, Wesley D.; and Hollenbeck, Keith E. Method of storing an ampoule for a needleless hypodermic injector. 4,010,747, Cl. 128-173.00H.
Clarke, Michael R.; and Desai, Raman L., to Canadian Patents and Development Limited. Aqueous ammoniacal zinc oxide compositions for lumber treatment. 4,011,090, Cl. 106-15.00R.
Clay, Howard W., to Reed Industries, Inc. Coin changer with spring-biased slides. 4,010,765, Cl. 133-4.00A.
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Cook, Danny G., to Liquid Processing Systems, Inc. Oil-water separation process and apparatus. 4,011,158, Cl. 210-23.00R.
Cook, Martin C.; Gregory, Gordon I.; and Bradshaw, Janice, to Glaxo Laboratories Limited. 3-Chloroalkylcarbamoyloxymethyl-7-[2-(fur-2-yl)-2-methoxyiminoacetamido]ceph-3-em-4-carboxylic acids and physiologically acceptable salts or oxides thereof. 4,011,215, Cl. 260-243.00C.
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Crimmins, David J.; and Sinclair, William Y., to Aries Electronics, Inc. Low profile socket having terminal pins sealingly mounted in socket housing. 4,010,992, Cl. 339-17.0CF.
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Curran, Adrian Charles Ward; Crossley, Roger; and Hill, David George, to John Wyeth & Brother Limited. 8-Cyano-5,6,7,8-tetrahydroquinoline derivatives. 4,011,225, Cl. 260-283.0CN.
Curran, Adrian Charles Ward, to John Wyeth & Brother Limited. 8-Carboxyl-tetrahydroquinoline derivatives. 4,011,226, Cl. 260-287.00T.
Curran, Adrian Charles Ward, to John Wyeth & Brother Limited. Carboxylic acid salts of tetrahydroquinolines and pyridine derivatives. 4,011,228, Cl. 260-287.00T.
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Curran, Adrian Charles Ward, to John Wyeth & Brother Limited. Piperidine derivatives. 4,011,331, Cl. 424-267.000.
Curry, Harold George; Attwood, Brian William; White, Derek Graham Walter; Christensen, John Mosgaard; and Kroyer, Karl Kristian Kobs, to Karl Kroyer St. Anne's Limited. Production of fibrous sheet material. 4,011,034, Cl. 425-80.000.
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Daab, Heinz; and Scheider, Bernd. Apparatus for immobilizing a working shaft at a predetermined angular position. 4,011,490, Cl. 318-269.000.
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De Feo, Francesco; Gonzati, Franco; and Osti, Alberto, to Aziende Colori Nazionali Affini ACNA S.p.A. Process for the preparation of 7-oxo-7H-dibenzo-[d e,h]-quinolin-2-ol. 4,011,224, Cl. 260-278.000.
De Feo, Francesco; Gonzati, Franco; and Osti, Alberto, to Aziende Colori Nazionali Affini ACNA S.p.A. O-(3-hydroxy-1-isoquinolinyl)-benzoic acid. 4,011,227, Cl. 260-287.00D.
Defrawi, Mohamed, to Du Pont de Nemours, E. I., and Company. Process for preparing highly absorbent, low bulk density sodium silicate. 4,011,302, Cl. 423-332.000.
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Delgado Barri, Luis. Remote detector to indicate leakage of liquids in toilet tanks. 4,011,553, Cl. 340-242.000.
Delgrosso, Eugene Joseph; Carlson, Carl Edwin; and Jennings, James Augustus, to United Technologies Corporation. Method for making blade protective sheaths. 4,010,530, Cl. 29-156.80B.
Del Monte, Louis A.; and Grangroth, Robert H., to Honeywell Inc. Material deposition masking for microcircuit structures. 4,011,143, Cl. 204-15.000.
De Lorenzo, Bruce L.; and McCarthy, Daniel J., to Plast-O-Matic Valves, Inc. Leak detection arrangement for valve having sealing means. 4,010,769, Cl. 137-312.000.
Deluty, Michael E. Pull type friction exercising device. 4,010,948, Cl. 272-133.000.
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Dybel, Frank R., to International Measurement & Control Co. Piezoelectric transducer sensor for use in a press. 4,010,679, Cl. 100-53.000.
Eagle Rubber Co., Inc.: *See*—
Cooke, Lawrence G., 4,010,501.
Eastman Kodak Company: *See*—
Durning, Maurice Francis; and Starr, John Edward, 4,011,083.
Gilman, Paul B.; and Morgan, John V., 4,011,081.
McCabe, John Murray, 4,011,080.
McFarlane, Finley E.; and Davis, Thomas G., 4,011,199.
Ponticello, Ignazio S., 4,011,201.
Seymour, Robert W.; and Wooten, Willis C., Jr., 4,011,285.
Seymour, Robert W.; Shepherd, Freddie A.; and Gray, Theodore F., Jr., 4,011,286.
Simson, Joseph Michael, 4,011,086.
Ebauches S.A.: *See*—
Chetelat, Fernand; and Hersberger, Pierre, 4,011,557.
Ebel, Lawrence G. Combined container for new and waste crankcase oil. 4,010,863, Cl. 220-1.00C.
Eberhardt & Co.: *See*—
Rese, Arkadijus; and Eberhardt, Hermann, 4,010,868.
Eberhardt, Hermann: *See*—
Rese, Arkadijus; and Eberhardt, Hermann, 4,010,868.
Eberle, William J., to General Battery Corporation. Acid filling apparatus for batteries or the like. 4,010,780, Cl. 141-168.000.
Eberle, William J., to General Battery Corporation. Automatic air leak testing apparatus for multiple chambered containers. 4,010,840, Cl. 198-345.000.
Eberspacher, J.: *See*—
Kofink, Siegfried; Rich, Wolfgang; and Langen, Herbert, 4,010,895.
Ebihara, Heihachiro; and Sekiya, Fukuo, to Citizen Watch Co., Ltd. Electronic device for detecting the energized state of a liquid crystal display cell. 4,011,002, Cl. 350-160.0LC.
Ebner, Karl; Ettinger, Franz; Fuchs, Rudolf; and Schnorr, Helmut, to Akzona Incorporated. Separating vaporous reaction product in the production of polyesters. 4,011,202, Cl. 260-75.00M.
Eckerbom, Gunnar, to Aktiebolaget Tudor. Methods and apparatus for closing the bottom ends of electrode tubes. 4,011,370, Cl. 429-140.000.

Edwards, Allen P., to Hewlett-Packard Company. Apparatus for relative power measurements in a power meter. 4,011,509, Cl. 324-142.000.
Edwards, James Byrd: *See*—
Marsan, Mario Stephen; Diehl, Francis Louvaine; and Edwards, James Byrd, 4,011,172.
Edwards, John A.: *See*—
Beard, Colin C.; Edwards, John A.; and Fried, John H., 4,011,320.
Edwards, John Wilmar; and Farrant, Barry William, to Imperial Chemical Industries Limited. Coating compositions comprising tetrafluoroethylene polymers and aluminum hydroxychloride. 4,011,187, Cl. 260-29.60F.
Edwards, Walter William. Thumb trigger and automatic safety. 4,010,566, Cl. 42-69.00R.
Eft, Sheldon E. Power drill support and guide apparatus. 4,010,943, Cl. 269-87.100.
Egli, Glen H., to Joglex Corporation. Fireplace furnace. 4,010,729, Cl. 126-121.000.
Ehlers, Karl: *See*—
Wicking, Hans Wilhelm; and Ehlers, Karl, 4,010,937.
Eichholz, Werner; and Krebs, Gerd, to Phoenix Gummiwerke A.G. Drum for producing blanks for car tires. 4,011,126, Cl. 156-416.000.
Eichholz, Werner; and Krebs, Gerd, to Phoenix Gummiwerke Aktiengesellschaft. Tire building drum. 4,011,127, Cl. 156-416.000.
Eichhorn, Thomas F.: *See*—
Arter, Nelson K.; Eichhorn, Thomas F.; and Kalthoff, Clement H., 4,011,587.
Eilberg, Ralph G.: *See*—
Soldati, Gianluigi; Eilberg, Ralph G.; Melger, Helga; and Schlichting, David A., 4,011,310.
Eilenberg, Jon Arthur; and Naugle, George Henry, to International Paper Company. Apparatus for forming articles such as carton blanks. 4,010,676, Cl. 93-51.00R.
Einhorn, Ruediger, to Coats & Clark, Inc. Shelf bracket assembly and bracket for said assembly. 4,010,697, Cl. 108-93.000.
Einhorn, Ruediger, to Coats & Clark, Inc. Method of casting an article having a body cavity. 4,010,794, Cl. 164-94.000.
Eisenhower, Walter D.: *See*—
Paivinen, John O.; and Eisenhower, Walter D., 4,011,105.
Eisert, Gerald A., to Central Research Laboratories, Inc. Sealing device. 4,010,588, Cl. 52-398.000.
Eiwen, George Ernest, to RCA Corporation. Method for devacuating a vacuum tube. 4,010,991, Cl. 316-2.000.
Ekstrom, Gosta Ivar; and Johansson, Karl-Evert, to Atlas Copco Aktiebolag. Arrangement for muffling the exhaust of a pneumatic rock drilling machine. 4,010,819, Cl. 181-36.00A.
Electricite de France (Service National): *See*—
Goudal, Philippe, 4,011,148.
Eli Lilly and Company: *See*—
O'Doherty, George O. P., 4,011,341.
Ellis, Christopher R.; Gibbon, Richard H.; and Stirling, Walter R., to Ferodo Limited. Clutch engaged brake mechanism. 4,010,827, Cl. 188-71.200.
Ellsworth, Carolyn; and Herring, L. W., to Ellsworth, Carolyn. Electronic mathematics trainer. 4,010,556, Cl. 35-30.000.
Elsters Inc.: *See*—
Levenback, George; and Marks, Ronald Aaron, 4,011,101.
Empresa Nacional del Aluminio, S.A.: *See*—
Rodriguez-Martinez, Dionisio, 4,011,152.
Energy Systems Corporation: *See*—
Mayo, Kenneth E.; and Fink, Charles R., 4,010,704.
Engeler, William E., to General Electric Company. Apparatus for sensing optical signals. 4,011,442, Cl. 235-193.000.
Engelhard Minerals & Chemicals Corporation: *See*—
Highberg, Carle W., 4,010,583.
Englund, Mariane L.: *See*—
Davis, Alden B.; Dutmers, Earl S.; and Englund, Mariane L., 4,010,499.
Ensign Electronics, Inc.: *See*—
Forsyth, Eric B., 4,010,603.
Eprad Incorporated: *See*—
Boudouris, Angelo; Petty, William D.; and Simonds, Clarence S., 4,010,910.
Epstein, Max; and Marhic, Michel E., to Northwestern University. Fiber optic laser illuminators. 4,011,403, Cl. 358-209.000.
Ericson, Eric Axel; and Kaufhold, Frederick Daniel, to General Electric Company. Position indicator for drawout apparatus. 4,011,424, Cl. 200-308.000.
Erikson, Alma Doris. Collapsible painter's canvas frame holder rack. 4,010,851, Cl. 211-189.000.
Ernst, Thomas J., to Ralston Purina Company. Process for the production of a formed high moisture pet food product. 4,011,346, Cl. 426-104.000.
Escher Wyss G.m.b.H.: *See*—
Selder, Harald, 4,011,027.
Essex International, Inc.: *See*—
Fosnough, Robert D.; and Bennett, David F., 4,011,428.
Etat Francais represente par le Delegue Ministeriel pour l'Armement: *See*—
Pretet, Georges Jean-Marie, 4,010,706.
Ethicon, Inc.: *See*—
DuMont, Jacques; and Romagne, Jacques, 4,010,756.
Ethyl Corporation: *See*—
Dugas, Michael G., 4,010,712.
Kao, James T. F., 4,011,089.
Etter, Berwyn E. Method of transporting natural gas. 4,010,622, Cl. 62-48.000.
Ettinger, Franz: *See*—
Ebner, Karl; Ettinger, Franz; Fuchs, Rudolf; and Schnorr, Helmut, 4,011,202.
Eutectic Corporation: *See*—
Steine, Hans T.; Wasserman, Rene; and Simm, Wolfgang, 4,011,056.
Evans, Leslie Samuel; Markin, Trevor Leslie; and Bones, Roger John, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the. Sodium-sulphur electric cells. 4,011,367, Cl. 429-104.000.
Evdokimova, Anna Vasilievna: *See*—
Tjurin, Boris Konstantinovich; Momot, Appolon Lukich; Volodin, Nikolai Lvovich; Peremitina, Valentina Trofimovna; Evdokimova, Anna Vasilievna; Churov, Vyacheslav Petrovich; Krugly, Samuil Markovich; and Garifzyanov, Gabdulbar Garifzyanovich, 4,011,251.
Exxon Production Research Company: *See*—
Garcia, Juan A., 4,010,804.
F. Jos. Lamb Company: *See*—
Bonzack, Eugene P., 4,010,841.
F. L. Smithe Machine Company, Inc.: *See*—
Mueller, Heinz Jakob, 4,010,598.
Fabry, Lloyd W.; and Brame, Thomas Vinton. Single wire system with delay switching circuit for selective control of navigation and strobe lights. 4,011,541, Cl. 340-25.000.
Facet Enterprises, Inc.: *See*—
Puro, John Frederick, 4,010,832.
Fairbanks, Fred A. Water waste treatment. 4,011,163, Cl. 210-208.000.
Fake, Charles Sylvester, to Beecham Group Limited. Tetrahydropyrid-4-yl-chroman-5-ol derivatives in the treatment of hypertension. 4,011,329, Cl. 424-263.000.
Falk, Richard A. Molten metal samplers with flow diverter. 4,010,649, Cl. 73-425.40R.
Falk, Theodore John, to Calspan Corporation. Radial flow laser. 4,011,522, Cl. 331-94.50G.
Falkner, Raimund; and Grune, Heinz, to Rapena Patent - und Verwaltungs-AG. Method and device of making a profiled body of at least one band of materials. 4,010,628, Cl. 72-181.000.
Farner, Hans U. Apparatus and method to control forward control surface type aircraft in flight. 4,010,920, Cl. 244-89.000.
Farr, John B., to Standard Oil Company (Indiana). Combined electret hydrophone and transmission line. 4,011,540, Cl. 340-7.00R.
Farrant, Barry William: *See*—
Edwards, John Wilmar; and Farrant, Barry William, 4,011,187.
Farrier, Ray W.; and Leavens, Roland B., to Diamond Fruit Growers, Inc. Process for inhibiting browning of fruit. 4,011,348, Cl. 426-268.000.
Fasching, George E., to United States of America, Energy Research and Development Administration. High voltage pulse generator. 4,011,463, Cl. 307-110.000.
Feher, Tibor. Hosiery machine with terry forming apparatus. 4,010,626, Cl. 66-93.000.
Feierabend, Louis B.; and Luhrs, Otto R., to International Business Machines Corporation. Apparatus for contouring magnetic head surfaces and method therefor. 4,010,574, Cl. 51-121.000.
Feng, Ching C., to Becton, Dickinson Electronics Company. Acoustic emission transducer. 4,011,472, Cl. 310-8.100.
Ferodo Limited: *See*—
Ellis, Christopher R.; Gibbon, Richard H.; and Stirling, Walter R., 4,010,827.
Ferrara, John M., to Narco Scientific Industries, Inc. Apparatus for measuring the phase relation of two alternating current signals. 4,011,503, Cl. 324-83.00R.
Ferro Manufacturing Corporation: *See*—
Pickles, Joseph, 4,010,927.
Feuerstein, Roger F.; Freeman, Maurice A.; and Spinelli, Leonardo B., to General Electric Company. Borescope support apparatus. 4,011,017, Cl. 356-241.000.
Feurstein, Ludwig J.; Meives, Otis E.; Schelk, Roger E.; and Verhyen, Larry L., to Pemco, Inc. Wrapped package inspection and rejection apparatus. 4,011,155, Cl. 209-74.00R.
Fido, Paul Edgar: *See*—
Ansari, Hifzur Rahman; Fido, Paul Edgar; and Wagner, Horst Richard, 4,011,177.
Filippi, Ernest A.: *See*—
Smith, Matthew S.; and Filippi, Ernest A., 4,010,688.
Filippov, Jury Vasilievich; Vendillo, Vsevolod Petrovich; and Ox, Nikolai Alexandrovich. High frequency ozonizer. 4,011,165, Cl. 250-540.000.
Finelli, Thomas M.: *See*—
Cocozella, Robert A.; Dal Pan, Florindo F.; Finelli, Thomas M.; and Patterson, Duane M., 4,010,690.
Fink, Charles R.: *See*—
Mayo, Kenneth E.; and Fink, Charles R., 4,010,704.
Finley, Gwendolyne: *See*—
Finley, T. J.; and Finley, Gwendolyne, 4,010,569.
Finley, T. J.; and Finley, Gwendolyne. Connector for flexible lines. 4,010,569, Cl. 43-44.830.
Firester, Arthur Herbert, to RCA Corporation. Optical element for a laser. 4,011,524, Cl. 331-94.50C.
Firmenich S.A.: *See*—
Naf, Ferdinand; and Ohloff, Gunther, 4,011,269.
Fischer, Athur. Tool for forming a hole for a fastening element. 4,010,807, Cl. 175-325.000.

Fischer, Josef; Baarfusser, Johann; and Maier, Helmut, to AGFA-Gevaert, A.G. Arrangement for continuously cleaning flexible layer substrates in tape form. 4,010,514, Cl. 15-306.00A.

Fischer, Otto H., to Stowell Industries Inc. Rotary spray station for bottle washers. 4,010,774, Cl. 134-104.000.

Fischer & Porter Co.: *See*—
Herzl, Peter J., 4,010,645.

Fisher, Alfred J., III; and Collins, Cecil A. Latch structure for vehicle seats. 4,010,979, Cl. 297-379.000.

Fisher, Christopher L., to Armco Steel Corporation. Composite arch structure. 4,010,617, Cl. 61-45.00R.

Fitzsimons, Ron. Foot massager. 4,010,743, Cl. 128-57.000.

Flamand, Maurice, to Rockwell International Corporation. Tape wheel for shuttleless looms. 4,010,776, Cl. 139-449.000.

Flanagan, Charles D., to Texas Instruments Incorporated. Magnetic relay. 4,011,534, Cl. 335-186.000.

Fleck, Adolf: *See*—
Dreher, Karl; Fleck, Adolf; Gotze, Christian; Ismann, Ernst; and Pflugbeil, Mathias, 4,010,912.

Fleming, James William, Jr.; Jaeger, Raymond Edward; and Miller, Thomas John, to Bell Telephone Laboratories, Incorporated. GeO_2-B_2O_3-SiO_2 Optical glass and lightguides. 4,011,006, Cl. 350-96.00M.

Fletcher Engineering, Inc.: *See*—
Fletcher, J. Lawrence, 4,010,661.

Fletcher, J. Lawrence, to Fletcher Engineering, Inc. Chain saw sharpening tool. 4,010,661, Cl. 76-36.000.

Fletcher-Terry Company, The: *See*—
Richardson, Philip E.; and Lenhardt, Lothar, 4,010,542.

Flix, Jean-Marie; and Payen, Guy. Mobile agricultural spray machine. 4,010,900, Cl. 239-168.000.

FMC Corporation: *See*—
Carevic, Frank E.; and Labriola, Anthony, 4,011,196.

Folser, Karl: *See*—
Theurer, Josef; and Folser, Karl, 4,010,691.

Fontanella, Luigi; and Maffii, Guilio, to Gruppo Lepetit S.p.A. 2-Imidazolidione derivatives. 4,011,238, Cl. 260-309.700.

Forbes, Stuart G.: *See*—
Mansell, Dennis N.; Bullock, Donald L.; and Forbes, Stuart G., 4,011,523.

Forbro Design Corporation: *See*—
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Ford, M. William: *See*—
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Ford Motor Company: *See*—
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Hetke, Adolf; and Bonds, Kip M., 4,010,791.
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Muller, George H.; and Vivian, Lloyd R., Jr., 4,010,658.
Muller, George H.; and VanWicklin, Warren A., Jr., 4,010,659.
Piatkowski, Philip, Jr., 4,010,650.

Forseen, Roger K.; and Hofacker, David A., to Minnesota Mining and Manufacturing Company. Articles providing sustained release and method of making. 4,011,061, Cl. 71-29.000.

Forsyth, Eric B., to Ensign Electronics, Inc. Time marking chronometer. 4,010,603, Cl. 58-39.500.

Fosler, Dick E., Jr.; and Krocheski, Thomas L., to Sperry Rand Corporation. Low power clock driver. 4,011,468, Cl. 307-270.000.

Fosnough, Robert D.; and Bennett, David F., to Essex International, Inc. Microwave oven timer and control circuit. 4,011,428, Cl. 219-10.55B.

Foster, Alan Carl: *See*—
Clark, Jack Phillip; Smith, Thurman Dale; and Foster, Alan Carl, 4,010,636.

Foster, Alan Ernest: *See*—
Parsons, David Charles; Parsons, Wendy Anne; Pigott, Norman Brian; and Foster, Alan Ernest, 4,010,924.

Fox, William B., Jr., to United States of America, Air Force. Oxygen generation method. 4,011,306, Cl. 423-579.000.

Foxboro Company, The: *See*—
Olsen, Everett O., 4,011,510.

Franke, Albrecht: *See*—
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Frankel, Milton B.: *See*—
Lo, George A.; and Frankel, Milton B., 4,011,117.

Frantl, Erich; Hofstatter, Peter; and Zemler, Willibald. Transfer joint for rigid frames. 4,011,020, Cl. 403-172.000.

Franz, Joseph Phillip; and Plunkett, Allan Barr, to General Electric Company. Apparatus for regulating magnetic flux in an AC motor. 4,011,489, Cl. 318-227.000.

Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.: *See*—
Theurer, Josef; and Folser, Karl, 4,010,691.

Fraser, Herbert James, to Australian Atomic Energy Commission. Logarithmic ratemeter with bistable signal comparison. 4,011,502, Cl. 324-78.00E.

Fred M. Dellorfano, Jr. & Donald P. Massa, Trustees of the Stoneleigh Trust: *See*—
Massa, Frank, 4,011,473.

Frederiksen, Thomas Marinus: *See*—
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Freedman, Bernard; and Diamond, Martin J., to United States of America, Agriculture. Photodegradable plastics containing halogenated diphenyl ethanes. 4,011,375, Cl. 526-1.000.

Freeman, Maurice A.: *See*—
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Frekko, Eugene A.: *See*—
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Frese, Albert: *See*—
Baxmann, Fritz; Dietrich, Johann; Dittmann, Walter; and Frese, Albert, 4,011,384.

Freyler, Adalbert. Telescopic shock absorber. 4,010,940, Cl. 267-9.00B.

Freze, Benjamin H., to Challenge-Cook Bros., Incorporated. Continuous processing apparatus and method for textile fabrics. 4,010,550, Cl. 34-23.000.

Fried, John H.: *See*—
Beard, Colin C.; Edwards, John A.; and Fried, John H., 4,011,320.

Fried. Krupp Huttenwerke AG: *See*—
Schindehutte, Manfred; Raquet, Erwin; and Licht, Helmut, 4,010,972.

Friedrich, Ralph E.: *See*—
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Frinzel, Jerry C.: *See*—
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Froemel, John G., to Illinois Tool Works Inc. Fluid sensor. 4,011,538, Cl. 338-35.000.

Fu, Yuan C., to United States of America, Energy Research and Development Administration. Liquefaction and desulfurization of coal using synthesis gas. 4,011,153, Cl. 208-10.000.

Fuchs, Rudolf: *See*—
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Fuji Photo Film Co., Ltd.: *See*—
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Fujii, Chikara: *See*—
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Fujii, Yasuji: *See*—
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Fujita, Noriaki: *See*—
Kamatani, Yoshio; Okazaki, Hisayoshi; Imai, Ko; Fujita, Noriaki; Yamazaki, Yoshio; and Ogino, Katsuhiko, 4,011,135.

Fujita, Toshio; Ishida, Katusada; and Funakoshi, Takehiko. Method of adjusting two concentric windings in electrical induction devices. 4,010,536, Cl. 29-593.000.

Fujiwara, Hiroshi; Asano, Koichi; Takahashi, Asao; and Sugishita, Akio, to Maruzen Oil Co. Ltd. Method for diaphragm electrolysis of alkali metal halides. 4,011,147, Cl. 204-98.000.

Fukase, Hisahiko; and Yoneda, Minoru, to Ishikawajima-Harima Jukogyo Kabushiki-Kaisha; and Kayabakogyo Kabushiki-Kaisha. Servocontroller. 4,011,493, Cl. 318-568.000.

Fukuda, Yoshiaki: *See*—
Kobayashi, Tatsumi; Takakura, Yutaka; Yoshino, Sadafumi; and Fukuda, Yoshiaki, 4,011,254.

Fukuhara, Seiji: *See*—
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Fukui, Suguru; Nishino, Haruo; Kameoka, Yohji; Miyazaki, Junichi; Kuroda, Toshio; and Konishi, Shinichi, to Chiyoda Chemical Engineering & Construction Co. Ltd. Method for simultaneous removal of SO_x and NO_x . 4,011,298, Cl. 423-235.000.

Fukumoto, Chiyoshi: *See*—
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Funai Pharmaceutical Industries, Ltd.: *See*—
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Furukawa Electric Co., Ltd., The: *See*—
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G. D. Searle & Co.: *See*—
Goldkamp, Arthur H.; Mazur, Robert H.; and Schlatter, James M., 4,011,260.

Gabor, Robert J., to A & P Products Incorporated. Logic signal test device for indicating low, intermediate and high level signals. 4,011,508, Cl. 324-133.000.

Gaiser, Dieter; Koester, Eberhard; Schoettle, Klaus; and Guenther, Friedrich, to BASF Aktiengesellschaft. Magnetic tape cassette with screening shield. 4,011,593, Cl. 360-132.000.

Galantay, Eugene E.; and Kathawala, Faizulla G., to Sandoz, Inc. Hypolipidemic allene carboxylic acids. 4,011,339, Cl. 424-317.000.

Gale, David M., to Du Pont de Nemours, E. I., and Company. Toughened linear aromatic polymers. 4,011,293, Cl. 264-126.000.

Gale, Preston L.: *See*—
Helton, Eugene L.; Gale, Preston L.; Moen, Lowell J.; Mueller, Robert C.; Pierce, Walker L., Jr.; and Vermillion, Henry J., Jr., 4,011,051.

Gallagher, Gregory, Jr.; and Kingsbury, William D., to SmithKline Corporation. 4-Sulfanilamidothiazole. 4,011,210, Cl. 260-239.950.

Gallagher, John S.: *See*—
Kilian, Robert J.; and Gallagher, John S., 4,010,545.

Gallo, Mario, to Wirth Gallo and Company. Mass and force meter. 4,010,638, Cl. 73-141.00R.

Galvagni, Mario. Three dimensional pre-fabricated structural elements for building habitation units. 4,010,579, Cl. 52-79.800.

Gambro AG: *See—*
Stenberg, Kaj, 4,010,795.
Gar Design Research, Inc.: *See—*
Garchinsky, John S., 4,010,925.
Garber, Bernard. Shaped container. 4,010,860, Cl. 215-1.00R.
Garchinsky, John S., to Gar Design Research, Inc. Adjustable traffic signal mounting assembly. 4,010,925, Cl. 248-295.000.
Garcia, Arthur, to RCA Corporation. Directional power detector for propagating waves. 4,011,529, Cl. 333-10.000.
Garcia, Juan A., to Exxon Production Research Company. Distributed load liner hanger and method of use thereof. 4,010,804, Cl. 166-315.000.
Gardner, John Nicholson, to Hoffmann-La Roche Inc. Preparation and use of magnesium acetylene complex. 4,011,271, Cl. 260-638.00Y.
Garifzyanov, Gabdulbar Garifzyanovich: *See—*
Tjurin, Boris Konstantinovich; Momot, Appolon Lukich; Volodin, Nikolai Lvovich; Peremitina, Valentina Trofimovna; Evdokimova, Anna Vasilievna; Churov, Vyacheslav Petrovich; Krugly, Samuil Markovich; and Garifzyanov, Gabdulbar Garifzyanovich, 4,011,251.
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Garrett Corporation, The: *See—*
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Tree, Dennis Jack; and Tovey, F. Michael, 4,011,295.
Gaudet, Herbert C., to Midwest Microwave, Inc. Microwave attenuator having compensating inductive element. 4,011,531, Cl. 333-81.00A.
Gauthier, William Kohlmann. Surgical retractor. 4,010,741, Cl. 128-20.000.
Gawne, George; and Ouwerkerk, Cornelis, to Shell Oil Company. Process for the manufacture of impact-resistant polyvinyl aromatic compound. 4,011,284, Cl. 260-880.00R.
Gebr. Zehtner AG (Armierungs-Unternehmung): *See—*
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Geiss, Vernon L.: *See—*
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General Battery Corporation: *See—*
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Grier, Nathaniel, to Merck & Co., Inc. N-(Benzimidazol-2-yl)arylcarboxamides as ultraviolet (UV) light absorbers. 4,011,236, Cl. 260-309.200.
Griffin, Ronald G. Gate hinge. 4,010,504, Cl. 16-158.000.
Griffith, Edwin D., to Owens-Illinois, Inc. Food product containing cushioning means. 4,011,347, Cl. 426-124.000.
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Grois, Khaim Shlemovich; Kapustin, Vladislav Alexandrovich; Merzheevsky, Vladislav Alexeevich; Monastyrsky, Anatoly Mikhailovich; Shaposhnikov, Igor Nikolaevich; and Karasev, German Vasilievich. Method for regulating work current of half circuits of bipolar D.C. transmission line and system for effecting same. 4,011,496, Cl. 321-27.00R.
Gronlund, Thomas Richard. Portable support frame for a tennis net. 4,010,951, Cl. 273-29.0BC.
Gross, Charles Fleming, to Domtar Limited. Panel mounting. 4,010,589, Cl. 52-483.000.
Gross, Charles Fleming, to Domtar Limited. Movable partition trim piece. 4,010,591, Cl. 52-732.000.
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Guerster, Rene L.; and Leiter, Leigh David, to Ametek, Inc. Retriever reel. 4,010,913, Cl. 242-107.000.
Guglielmetti, Leonardo, to Ciba-Geigy Corporation. Process for the manufacture of 1,4-disubstituted bicyclic or tricyclic compounds and new 1,4-disubstituted bicyclic compounds. 4,011,261, Cl. 260-515.00P.
Guillot-Munoz, Maria. Appliance for the secure transport of domestic animals such as dogs and cats. 4,010,880, Cl. 224-42.42A.
Gulick, Joseph F., Jr., to United States of America, Navy. Phase modulated monopulse system. 4,011,564, Cl. 343-16.00M.
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Hanagan, Michael W., to Corbin Gentry Inc. Linear field control motor. 4,011,488, Cl. 318-139.000.
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Harris, Roy Clifford; and Martin, John William, to United States of America, Army. Explosive compositions with thermally conductive ingredient. 4,011,115, Cl. 149-22.000.
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Heiba, El Ahmadi I.; and Dessau, Ralph M., to Mobil Oil Corporation. Selective reactions of free radicals with olefins in the presence of an ion of Mn, V, or Ce. 4,011,239, Cl. 260-327.00S.
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Heitmann, Bob, to Hauni-Werke Korber & Co., KG. Splicing apparatus for webs of metallic foil or the like. 4,010,911, Cl. 242-58.400.
Heitzman, Charles J. Pulsating fluid spray device. 4,010,899, Cl. 239-101.000.
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Hempel, Rod A.; Tittman, Walter P.; and Sheth, Santosh D., to American Standard, Inc. Circulating fireplace system. 4,010,728, Cl. 126-120.000.
Hemstreet, Harold S.; Markle, David A.; Newell, William H.; and Offner, Abe, to Perkin-Elmer Corporation, The. Optical projection apparatus. 4,011,011, Cl. 355-18.000.
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Hockler, Norman N., to North Electric Company. Stand-alone cumulative elapsed-time calculating system. 4,011,434, Cl. 235-61.90R.
Hodge, Trevor A. Air conveyor with tunnel guide. 4,010,981, Cl. 302-2.00R.
Hoechst Aktiengesellschaft: *See*—
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Hohn, Richard Edward, to Cincinnati Milacron, Inc. Method and apparatus for compensating for unprogrammed changes in relative position between a machine and workpiece. 4,011,437, Cl. 235-151.110.
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Hook, Rollin E., to Armco Steel Corporation. High strength, deep drawing quality, low carbon steel, article formed therefrom, and method for production thereof. 4,011,111, Cl. 148-16.600.
Hopkins, John Root; Renn, Robert Maurice; and Southard, Robert Keith, to AMP Incorporated. Intrinsic certification assembly technique for wiring components into an electrical apparatus. 4,010,996, Cl. 339-47.00R.
Hopping, Alvin S. Internal combustion engine with afterburner, venturi cooler and exhaust turbine. 4,010,607, Cl. 60-274.000.
Hordeski, Michael F. Linear shaft encoder. 4,011,448, Cl. 250-237.00R.
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Kapstad, Odd B. Sheet support apparatus. 4,010,517, Cl. 24-67.110.

Kapustin, Vladislav Alexandrovich: *See—*
Grois, Khaim Shlemovich; Kapustin, Vladislav Alexandrovich; Merzheevsky, Vladislav Alexeevich; Monastyrsky, Anatoly Mikhailovich; Shaposhnikov, Igor Nikolaevich; and Karasev, German Vasilievich, 4,011,496.

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Grois, Khaim Shlemovich; Kapustin, Vladislav Alexandrovich; Merzheevsky, Vladislav Alexeevich; Monastyrsky, Anatoly Mikhailovich; Shaposhnikov, Igor Nikolaevich; and Karasev, German Vasilievich, 4,011,496.

Karl Kroyer St. Anne's Limited: *See—*
Curry, Harold George; Attwood, Brian William; White, Derek Graham Walter; Christensen, John Mosgaard; and Kroyer, Karl Kristian Kobs, 4,011,034.

Karol, Frederick J.: *See—*
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Karp, Arthur: *See—*
Podell, Allen F.; Young, Leo; Karp, Arthur; and Chambers, Donald R., 4,011,528.

Kartinen, Ernest O., to Burmah Oil & Gas Company. Vapor removal apparatus for oil/water separator. 4,010,891, Cl. 233-3.000.

Kaschak, Anthony A. Refrigerant transfer system. 4,010,623, Cl. 62-55.000.

Kasperkovitz, Wolfdietrich Georg, to U.S. Philips Corporation. Integrated circuit. 4,011,580, Cl. 357-51.000.

Kassel, Karl-Heinz: *See—*
Berle, Johannes; Dulken, Hartmut; Guder, Gottfried; and Kassel, Karl-Heinz, 4,011,079.

Katchka, Barron L.: *See—*
Cantrell, Ronald G.; and Katchka, Barron L., 4,010,969.

Kathawala, Faizulla G., to Sandoz, Inc. Phenoxyphenyl pyridyl compounds. 4,011,232, Cl. 260-297.00R.

Kathawala, Faizulla G.: *See—*
Galantay, Eugene E.; and Kathawala, Faizulla G., 4,011,339.

Kato, Masanori: *See—*
Sakuri, Osamu; Saito, Toshio; and Kato, Masanori, 4,010,903.

Kato, Saburo, to Ricoh Co., Ltd. Automatic reversal mechanism. 4,010,918, Cl. 242-191.000.

Katsuo, Kenichi: *See—*
Konomi, Tuyoshi; Yukimatsu, Keiji; Katsuo, Kenichi; and Yamaguchi, Masayasu, 4,011,203.

Katz, Jack: *See—*
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Kaufhold, Frederick Daniel: *See—*
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Kaufman, Sydney M., to Ford Motor Company. Copper coated, iron-carbon eutectic alloy powders. 4,011,077, Cl. 75-212.000.

Kaun, Thomas D.; Vissers, Donald R.; and Shimotake, Hiroshi, to United States of America, Energy Research and Development Administration. Uncharged positive electrode composition. 4,011,373, Cl. 429-218.000.

Kaun, Thomas D., to United States of America, Energy Research and Development Administration. Porous carbonaceous electrode structure and method for secondary electrochemical cell. 4,011,374, Cl. 429-220.000.

Kawachi, Manabu, to Pioneer Electronic Corporation. Tuning device for a radio receiver. 4,011,513, Cl. 325-312.000.

Kawada, Takehiko, to Denki Onkyo Company, Ltd. Cassette tape recorder with tape pad. 4,011,592, Cl. 360-130.000.

Kawai, Yoshihisa, to Minolta Camera Kabushiki Kaisha. Operation control device for copying apparatus. 4,011,012, Cl. 355-55.000.

Kawaki, Takao: *See—*
Yonemitsu, Eiichi; Sugio, Akitoshi; and Kawaki, Takao, 4,011,200.

Kawamura, Masami; and Suzuki, Yukio, to Hitachi, Ltd. Transistor amplifier circuit. 4,011,519, Cl. 330-29.000.

Kawano, Tsuyoshi: *See—*
Takechi, Hiroshi; Masui, Hiroaki; Fujii, Chikara; Kawano, Tsuyoshi; and Koyama, Kazuo, 4,011,106.

Kawata, Yoshihiro; and Iwata, Kansei, to Iwatsu Electric Co., Ltd. Display apparatus. 4,011,546, Cl. 340-172.500.

Kawatake, Katsunori: *See—*
Suziki, Katsumi; Kawatake, Katsunori; Sawada, Hiroshi; and Matsuoka, Hiroki, 4,010,723.

Kawneer Company, Inc.: *See—*
Hubbard, S. Eugene; and Biebuyck, Lawrence F., 4,010,671.

Kay, Ian Trevor, to Imperial Chemical Industries Limited. Imidazopyrimidines useful as agricultural and horticultural fungicides. 4,011,325, Cl. 424-251.000.

Kayabakogyo Kabushiki-Kaisha: *See—*
Fukase, Hisahiko; and Yoneda, Minoru, 4,011,493.

Keck, Karl: *See—*
Maucher, Paul; and Keck, Karl, 4,010,654.

Keil, Joseph W., to Dow Corning Corporation. Urethanes modified with siloxanes. 4,011,189, Cl. 260-33.6UB.

Keizer, Alan S.; and Harris, Hugh R., to Jade Corporation, The. Apparatus for accurately bonding leads to a semi-conductor die or the like. 4,010,885, Cl. 228-6.00A.

Keledy, Francis C.; and Nemes, Laszlo, to Trodyne Corporation. Differential pressure indicator including remote sensing means. 4,010,708, Cl. 116-65.000.

Kelley, Leon O. Flow through brush cutter. 4,010,805, Cl. 172-698.000.

Kellogg, Robert Melroy; and Kruger, Victor Robert, to International Business Machines Corporation. Centrifuge fluid container. 4,010,894, Cl. 233-27.000.

Kemmerling, Robert A.: *See—*
Reim, Thomas E.; Pollack, Jerry J.; and Kemmerling, Robert A., 4,010,857.

Kendall Company, The: *See—*
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Samour, Carlos M.; and Richards, Mildred C., 4,011,259.

Kennametal Inc.: *See—*
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Kepplinger, Hannes; and Schweighofer, Hermann, to Steyr-Daimler-Puch Aktiengesellschaft. Small arm. 4,010,673, Cl. 89-191.00A.

Kern, Loyd R.; and Perkins, Thomas K., to Petro-Canada Exploration Inc.; Imperial Oil Limited; and Canada-Cities Service, Ltd. Method for reducing power loss associated with electrical heating of a subterranean formation. 4,010,799, Cl. 166-248.000.

Kerr, George T.: *See—*
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Kertesz, Denis John: *See—*
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Keturi, Raymond C.; and Sandstrom, Wayne R. Cored slab building construction. 4,010,581, Cl. 52-220.000.

Khismatulin, Enver Rakhmatullovich: *See—*
Pimshtein, Pavel Gdalievich; Shel, Marat Moiseevich; Khismatulin, Enver Rakhmatullovich; Borsuk, Evgeny Grigorievich; Novikov, Alexandr Nikolaevich; Makarov, Viktor Matveevich; Ziselman, Boris Grigorievich; Kuramzhin, Alexandr Valeryanovich; Usenko, Viktor Grigorievich; Globin, Nikolai Kirillovich; and Ivantsov, Vladimir Viktorovich, 4,010,864.

Kidd, Archibald Watson. Mobile saw bench for farm use and the like. 4,010,665, Cl. 83-477.200.

Kikuci, Yoshiyuki: *See—*
Takemura, Yozo; Hirayama, Kouich; and Kikuci, Yoshiyuki, 4,010,793.

Kilian, Robert J.; and Gallagher, John S., to Johnson & Johnson. Adhesive bonding to teeth of orthodontic brackets and the like. 4,010,545, Cl. 32-14.00A.

Kim, In Su. Electron therapy device. 4,010,742, Cl. 128-24.400.

Kimberly-Clark Corporation: *See—*
Ring, David F., 4,010,751.

Kimmel, Milton Jay, to International Business Machines Corporation. Data processor for pattern recognition and the like. 4,011,547, Cl. 340-172.500.

Kingsbury, William D.: *See—*
Gallagher, Gregory, Jr.; and Kingsbury, William D., 4,011,210.

Kinsman, Robert Guy, to Motorola, Inc. Temperature compensated surface acoustic wave oscillator. 4,011,526, Cl. 331-107.00A.

Kirkland, Arthur C. Variable rate vehicle suspension. 4,010,941, Cl. 267-57.000.

Kissell, Fred N.; and Vinson, Robert P., to United States of America, Interior. Sampling method and apparatus. 4,010,647, Cl. 73-421.50R.

Kistner, Hermann, to Maschinenbau Oppenweiler GmbH. Continuous feeder. 4,010,945, Cl. 271-151.000.

Kjos, David M.; Jenness, Raymond C.; Sabaski, Richard E.; and Roloff, Carl A., to Allis-Chalmers Corporation. Grinding mill trunnion discharger to opposite facing screens. 4,010,904, Cl. 241-79.300.

Klang, Bo Gunnar: *See—*
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Klett, Gene R., to Caterpillar Tractor Co. Earth scraper with router bit. 4,010,561, Cl. 37-141.00T.
Kleven, Laurence P.: *See—*
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Klockner-Werke AG: *See—*
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Kloren, Ulrich, to Ringfeder GmbH. Bolt tensioning arrangement. 4,010,669, Cl. 85-1.00T.
Klug, Joseph R., to American Hospital Supply Corporation. Lockable drawer compartment. 4,010,989, Cl. 312-204.000.
Kmentt, Waldemar E.: *See—*
Oas, David C.; and Kmentt, Waldemar E., 4,011,039.
Kniepkamp, Alberto E. Rhythm unit with programmed envelope waveform, amplitude, and the like. 4,010,667, Cl. 84-1.030.
Kniesly, Richard A.; Colville, Larry L.; and Mullen, Jerrold L. Control for activating motor vehicle electrical load. 4,011,460, Cl. 307-10.0LS.
Knoblauch, Karl: *See—*
Munzner, Heinrich; Heimbach, Heinrich; Korbacher, Werner; Peters, Werner; Juntgen, Harald; Knoblauch, Karl; and Zundorf, Dieter, 4,011,065.
Knoche, Karl Friedrich: *See—*
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Knollenberg, Robert George; and Luehr, Robert E., to Particle Measuring Systems, Inc. Method and apparatus for determining valid sample volume. 4,011,459, Cl. 250-576.000.
Knutsen, Wallace N.: *See—*
Sochard, Irving I.; Petree, Marcella C.; Knutsen, Wallace N.; Warnock, Frederick E.; and White, Edward A., Jr., 4,010,689.
Ko, Wen-Chuang; and Sawatzky, Erich, to International Business Machines Corporation. Apparatus for measuring the beam current of charged particle beam. 4,011,449, Cl. 250-309.000.
Kobayashi, Kouichi: *See—*
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Kobayashi, Tatsumi; Takakura, Yutaka; Yoshino, Sadafumi; and Fukuda, Yoshiaki, to Nippon Soda Company Limited. Process for the purification of diaminomaleonitrile. 4,011,254, Cl. 260-465.50R.
Koch, Henning: *See—*
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Kofink, Siegfried; Rich, Wolfgang; and Langen, Herbert, to Eberspacher, J. System for preheating a water-cooled vehicle engine and for heating the interior of the vehicle. 4,010,895, Cl. 237-12.30C.
Kohler, Marc W., to Puppet Workshop, Inc., The. Puppet assembling. 4,010,570, Cl. 46-154.000.
Koide, Masanobu: *See—*
Tanimura, Shigeru; Yamamura, Nobuyuki; and Koide, Masanobu, 4,011,577.
Koike, Norio; Kamiyama, Takamitsu; and Ashikawa, Mikio, to Hitachi, Ltd. Scanning circuit to deliver train of pulses shifted by a constant delay one after another. 4,011,402, Cl. 358-213.000.
Kokusan Denki Co., Ltd.: *See—*
Kondo, Tetsuya; and Miyazaki, Katumasa, 4,010,726.
Kolbinger, Hans; and Wossagk, Ulf, to Messerschmitt-Bolkow-Blohm GmbH. Driving mechanism for the cover of an ammunition magazine on armored land vehicles. 4,010,672, Cl. 89-1.802.
Komatsu, Koei: *See—*
Matsumoto, Shuichi; Nakamura, Ryuichi; Fukuhara, Seiji; Suzuki, Kazuo; and Komatsu, Koei, 4,011,386.
Komatsu, Nobuhiko, to Green Cross Corporation, The. Process for producing antitumor compound. 4,011,140, Cl. 195-80.00R.
Komatsu, Toshiyoshi, to Duskin Franchise Co., Ltd. Mop suited for dusting curved surfaces. 4,010,508, Cl. 15-104.940.
Komatsu, Toshiyoshi, to Duskin Franchise Co., Ltd. Mop having sleeve type detachable mop head. 4,010,511, Cl. 15-104.940.
Komori, Shigeki: *See—*
Ishiguro, Moriyuki; Miyahara, Shinobu; Sugawara, Isao; Hanmyo, Masayuki; Uchida, Shigetaka; Uchibori, Hideo; and Komori, Shigeki, 4,010,792.
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Kondo, Tetsuya; and Miyazaki, Katumasa, to Kokusan Denki Co., Ltd. Device for preventing an overrunning operation of an internal combustion engine. 4,010,726, Cl. 123-148.0CC.
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Koppers Company, Inc.: *See—*
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Kordesch, Karl Victor, to Union Carbide Corporation. Cathode contact member for alkaline round cells. 4,011,103, Cl. 429-66.000.
Kosa, Yasunobu: *See—*
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Kosky, Philip G.; and Jaster, Heinz, to General Electric Company. Vaporization cooled transformer. 4,011,535, Cl. 336-57.000.
Kotera, Hiroaki: *See—*
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Kowalski, Leon. Primer cord dispenser. 4,010,914, Cl. 242-129.620.
Koyama, Kazuo: *See—*
Takechi, Hiroshi; Masui, Hiroaki; Fujii, Chikara; Kawano, Tsuyoshi; and Koyama, Kazuo, 4,011,106.
Koyama, Nobuo. Animal skinning apparatus. 4,010,515, Cl. 17-21.000.
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Kraska, Robert E.; and Mulier, Pieter M. J., to Medtronic, Inc. Coupling assembly for implantable electromedical devices. 4,010,760, Cl. 128-419.0PS.
Krauja, Ziedonis I.: *See—*
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Kriebel, Manfred: *See—*
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Krieger, Raymond Buchheimer, Jr., to American Cyanamid Company. Apparatus for measuring the stiffness characteristic of structural adhesives. 4,010,640, Cl. 73-150.00A.
Krieger, Raymond Buchheimer, Jr., to American Cyanamid Company. Apparatus for measuring the stiffness characteristic of structural adhesives. 4,010,641, Cl. 73-150.00A.
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Kulik, James: *See—*
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Lakso, Eino E. Self-erecting folding step stool. 4,010,699, Cl. 108-133.000.
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Lama, William L.; Seachman, Ned J.; and Bright, Clark I., to Xerox Corporation. Reflection diffraction grating having a controllable blaze angle. 4,011,009, Cl. 350-162.00R.
Lambert, Emmanuel; and Leger, Lucien, to Glaverbel-Mecaniver S.A. Laminated glazing pane. 4,011,356, Cl. 428-34.000.
Lambert, Gerard Edouard; and Begis, Roger, to Societe Seveg Etudes Equipments Graphiques. Liquid level control. 4,010,683, Cl. 101-366.000.
Lambert, Lloyd J., Sr. Variable weight exercise machine. 4,010,947, Cl. 272-118.000.
Lambrecht, Richard M.; Packer, Samuel; Merrill, Jerald C.; Atkins, Harold L.; Wolf, Alfred P.; and Bradley-Moore, Patrick R., to United States of America, Energy Research and Development Administration. Production of ^{201}Pb-tris-hydroxymethyl amino methane. 4,011,307, Cl. 424-1.000.
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Lange, Emil. Device with arc-extinguishing system. 4,011,426, Cl. 200-144.00C.
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Lappa, Cleto L. Rotary internal combustion engine. 4,010,719, Cl. 123-44.00C.
Laprade, Bernard R.; Laprade, Xavier J.; and Gele, Pierre J. Metering control for the air-fuel mixture in internal combustion engines. 4,010,722, Cl. 123-119.00D.
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Layne, Charles R.; and Ford, M. William, to Martin Marietta Corporation. Semiconductor radiation wavelength detector. 4,011,016, Cl. 356-195.000.
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Leach, John Meredith. Sphygmomanometer. 4,010,739, Cl. 128-2.05G.
Leach, John Meredith. Material handling conveyor loader. 4,010,844, Cl. 198-562.000.
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Lee, Chi-Long, to Dow Corning Corporation. Method of curing organosiloxane compositions using microwaves. 4,011,197, Cl. 260-46.50R.
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Midwest Microwave, Inc.: *See*—
Gaudet, Herbert C., 4,011,531.

Milbrada, Edward John: *See*—
Diehl, Francis Louvaine; Zeffren, Eugene; and Milbrada, Edward John, 4,011,169.

Miles, Leon H.; and Martin, Ferman G., to Atlantic Richfield Company. Well stimulation. 4,010,802, Cl. 166-281.000.

Miller, Chauncey S., III, to TRW Inc. Audio transmission protection apparatus. 4,011,408, Cl. 179-1.50R.

Miller, Jack H.: *See*—
Smith, John A.; Miller, Jack H.; Schilling, Russell C.; and North, Howard L., Jr., 4,010,893.

Miller, James Granville, to Owens-Illinois, Inc. Lung exercise device. 4,010,946, Cl. 272-99.000.

Miller, Jeanette Mary; and Miller, Robert Eric, to Miller, Timothy Robert; and Miller, Victoria Alice, part interest to each. Supports for cameras. 4,010,923, Cl. 248-183.000.

Miller, Robert Eric: *See*—
Miller, Jeanette Mary; and Miller, Robert Eric, 4,010,923.

Miller, Thomas John: *See*—
Fleming, James William, Jr.; Jaeger, Raymond Edward; and Miller, Thomas John, 4,011,006.

Miller, Timothy Robert: *See*—
Miller, Jeanette Mary; and Miller, Robert Eric, 4,010,923.

Miller, Victoria Alice: *See*—
Miller, Jeanette Mary; and Miller, Robert Eric, 4,010,923.

Minamida, Isao: *See*—
Terao, Shinji; Shiraishi, Mitsuru; Miyawaki, Toshio; Minamida, Isao; Yamaoka, Masayoshi; and Numata, Mitsuo, 4,011,214.

Minesinger, Richard R.: *See*—
Dacons, Joseph C.; and Minesinger, Richard R., 4,011,265.

Minka, Karlis. Rotary engine. 4,010,716, Cl. 123-8.470.

Minnesota Mining and Manufacturing Company: *See*—
Aysta, James E., 4,010,994.
Carey, Patrick H., Jr., 4,011,067.
Forseen, Roger K.; and Hofacker, David A., 4,011,061.
Johnston, Manley R., 4,011,063.
Pastor, Sheldon Lee; and Argento, Dan J., 4,011,586.
Roelofs, Glenn E., 4,011,358.
Worden, Robert A., 4,011,130.

Minolta Camera Kabushiki Kaisha: *See*—
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Mironov, Jury Vasilievich: *See*—
Slezinger, Isaak Isaevich; Belitsky, Georgy Mironovich; Shiryaev, Vladimir Alexandrovich; and Mironov, Jury Vasilievich, 4,010,632.

Mita, Kunio, to Asahi Kogaku Kogyo Kabushiki Kaisha. Shutter release mechanism for cameras with an electric shutter. 4,011,572, Cl. 354-266.000.

Mitchell, Douglas F.: *See*—
Rapoport, Sidney L.; and Mitchell, Douglas F., 4,011,085.

Mitchell, Hal D., to A-T-O Inc. Athletic shoe. 4,010,559, Cl. 36-128.000.

Mitchell, Richard Patrick; and Gorshe, Thomas Mathew, to American Can Company. Method for cold lidding containers with elastomeric film. 4,011,119, Cl. 156-69.000.

Mitchell, Terry L. Fireplace shield. 4,010,730, Cl. 126-140.000.

Mitchell, Wallace F., to Ammco Tools, Inc. Two-stage wheel balancer. 4,010,651, Cl. 73-483.000.

Mitsubishi Gas Chemical Co., Ltd.: *See*—
Yonemitsu, Eiichi; Sugio, Akitoshi; and Kawaki, Takao, 4,011,200.

Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Hirakawa, Tadashi; and Hoshino, Noriyuki, 4,010,677.

Mitsubishi Rayon Co., Ltd.: *See*—
Matsuzawa, Hideo; Ikeda, Minoru; Sugimoto, Yukinobu; and Uchida, Shuji, 4,011,272.

Miyahara, Shinobu: *See*—
Ishiguro, Moriyuki; Miyahara, Shinobu; Sugawara, Isao; Hanmyo, Masayuki; Uchida, Shigetaka; Uchibori, Hideo; and Komori, Shigeki, 4,010,792.

Miyamoto, Toshio. Automatic threading device for sewing machines. 4,010,702, Cl. 112-225.000.

Miyawaki, Toshio: *See*—
Terao, Shinji; Shiraishi, Mitsuru; Miyawaki, Toshio; Minamida, Isao; Yamaoka, Masayoshi; and Numata, Mitsuo, 4,011,214.

Miyazaki, Akihisa: *See*—
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Miyazaki, Junichi: *See*—
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Miyazaki, Katumasa: *See*—
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Mizuno, Koji: *See*—
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Moen, Lowell J.: *See*—
Helton, Eugene L.; Gale, Preston L.; Moen, Lowell J.; Mueller, Robert C.; Pierce, Walker L., Jr.; and Vermillion, Henry J., Jr., 4,011,051.

Mogensen, Sten, to AGA Aktiebolag. Method for the achievement of an acetylene gas mixture. 4,010,777, Cl. 141-4.000.

Moisander, Jukka, to Rauma-Repola Oy. Method and device for feeding trees in tree harvesting apparatus. 4,010,782, Cl. 144-309.0AC.

Moleyre, Jacques: *See*—
Mauvernay, Roland-Yves; Monteil, Andre; Simond, Jacques; Moleyre, Jacques; and Busch, Norbert, 4,011,240.

Molina, Orlando G., to Rockwell International Corporation. Water washable dye penetrant composition and method of application. 4,011,174, Cl. 252-301.190.

Molz, Gottfried: *See*—
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Momot, Appolon Lukich: *See*—
Tjurin, Boris Konstantinovich; Momot, Appolon Lukich; Volodin, Nikolai Lvovich; Peremitina, Valentina Trofimovna; Evdokimova, Anna Vasilievna; Churov, Vyacheslav Petrovich; Krugly, Samuil Markovich; and Garifzyanov, Gabdulbar Garifzyanovich, 4,011,251.

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Monastyrsky, Anatoly Mikhailovich: *See*—
Grois, Khaim Shlemovich; Kapustin, Vladislav Alexandrovich; Merzheevsky, Vladislav Alexeevich; Monastyrsky, Anatoly Mikhailovich; Shaposhnikov, Igor Nikolaevich; and Karasev, German Vasilievich, 4,011,496.

Monsanto Company: *See*—
Golland, David I.; Runkle, Charles J.; Kozak, Milan F.; and Schey, John A., 4,011,109.
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Mooney, Gerald R.; and Mooney, Louis A. Load tie-down and anchor system. 4,010,694, Cl. 105-482.000.

Mooney, Louis A.: *See*—
Mooney, Gerald R.; and Mooney, Louis A., 4,010,694.

Moore, Bernard S.: *See*—
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Moore, Henry Jack, Jr.: *See*—
Stanley, Robert F.; and Moore, Henry Jack, Jr., 4,010,735.

Moore, Stanley W., to United States of America, Energy Research and Development Administration. Structurally integrated steel solar collector. 4,010,733, Cl. 126-271.000.

Mor-Flo Industries, Inc.: *See*—
Stanley, Robert F.; and Moore, Henry Jack, Jr., 4,010,735.

Moreau, Wayne M.: *See*—
Gipstein, Edward; Moreau, Wayne M.; and Need, Omar U., III, 4,011,351.

Morgan, John V.: *See*—
Gilman, Paul B.; and Morgan, John V., 4,011,081.

Morgan, Robert G.: *See*—
Martin, Daniel W.; and Morgan, Robert G., 4,010,557.

Mori, Jun-Ichi: *See*—
Tagawa, Takashi; and Mori, Jun-Ichi, 4,011,450.

Morioka, Yoshitsugu: *See*—
Tochitani, Yutaka; Shinbata, Takashi; and Morioka, Yoshitsugu, 4,011,556.

Moriya, Tokio, to Kabushiki Kaisha Daini Seikosha. Liquid crystal device. 4,011,001, Cl. 350-160.0LC.

Morozowich, Walter, to Upjohn Company, The. Substituted keto and alkoxy carbonyl esters of 16-substituted PGE_2 type compounds. 4,011,249, Cl. 260-390.000.

Morris, Carl M.; Manchester, William E.; Hill, John L.; Bridwell, Robert A.; and Hugill, Douglas B., to Northrop Corporation. Hot stretch-wrap forming with resistance heating. 4,011,429, Cl. 219-153.000.

Morris, Guy Vernon: *See*—
Aufderheide, Maurice Bernard; and Morris, Guy Vernon, 4,011,438.

Morrison Machine Co.: *See*—
Stanislaw, Peter, 4,010,522.

Morrow, William D.: *See*—
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MOS Technology, Inc.: *See*—
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Moses, Robert Dale: *See*—
Ronian, Richard K.; and Moses, Robert Dale, 4,010,859.

Motorola, Inc.: *See*—
Aufderheide, Maurice Bernard; and Morris, Guy Vernon, 4,011,438.
Bormann, Alan Richard, 4,011,549.
Davis, William Folsom; and Frederiksen, Thomas Marinus, 4,011,470.
Dounce, Eric Alexander, 4,011,561.
Drury, David Michael, 4,011,512.
Havens, Richard Calvin, 4,011,527.
Kinsman, Robert Guy, 4,011,526.
Munz, Douglas B.; and Skoda, William G., 4,011,398.

Motz, Jerome C.; and Pokora, Robert J., to Rexnord Inc. Liner segment for use in cone crushers and the like. 4,010,905, Cl. 241-295.000.

Muccillo, Vincent Joseph, Jr. Platform scale. 4,010,811, Cl. 177-257.000.

Mueller Co.: *See*—
Sands, Robert E., 4,010,930.

Mueller, Heinz Jakob, to F. L. Smithe Machine Company, Inc. Device for folding the closure flap of envelopes. 4,010,598, Cl. 53-376.000.

Mueller, Robert C.: *See*—
Helton, Eugene L.; Gale, Preston L.; Moen, Lowell J.; Mueller, Robert C.; Pierce, Walker L., Jr.; and Vermillion, Henry J., Jr., 4,011,051.

Muhlfelder, Ludwig: *See*—
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Muhs, Donald P., to Bendix Corporation, The. Barometric non-linear altitude compensator means. 4,010,646, Cl. 73-387.000.

Mulier, Pieter M. J.: *See*—
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Mullen, Jerrold L.: *See*—
Kniesly, Richard A.; Colville, Larry L.; and Mullen, Jerrold L., 4,011,460.

Muller, George H.; and Vivian, Lloyd R., Jr., to Ford Motor Company. Steering wheel having flexible rim. 4,010,658, Cl. 74-552.000.

Muller, George H.; and VanWicklin, Warren A., Jr., to Ford Motor Company. Steering wheel having helical rim core. 4,010,659, Cl. 74-552.000.

Munz, Douglas B.; and Skoda, William G., to Motorola, Inc. Electrical connection to a circuit potted within a housing and method of same. 4,011,398, Cl. 174-52.0PE.

Munzner, Heinrich; Heimbach, Heinrich; Korbacher, Werner; Peters, Werner; Juntgen, Harald; Knoblauch, Karl; and Zundorf, Dieter, to Bergwerksverband GmbH. Process for the enrichment of gases. 4,011,065, Cl. 55-25.000.

Murphy, Charles Vincent; and Zunker, David William, to Du Pont de Nemours, E. I., and Company. Process for preparing emulsions by polymerization of aqueous monomer-polymer dispersions. 4,011,388, Cl. 526-320.000.

Murphy, Douglas W.: *See*—
Hightower, John D.; Beaman, George R.; Wilkins, George A.; and Murphy, Douglas W., 4,010,619.

Murphy, Howard G.; Schmidt, Harvey E.; and Gilmore, Thomas P., to Allis-Chalmers Corporation. Chopper motor controller having pulse-by-pulse sensing of plugging. 4,011,492, Cl. 318-373.000.

Muse, Joel, to Goodyear Tire & Rubber Company, The. Resins and polymer mixtures thereof. 4,011,178, Cl. 260-4.0AR.

N.K.F. Kabel B.V.: *See*—
Van Deventer, Gijsbrecht Coenraad; and Visser, Gerard Adriaan, 4,011,396.

N. V Optische Industrie "De Oude Delft": *See*—
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Nadella: *See*—
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Nadelson, Jeffrey, to Sandoz, Inc. Hypolipidemic bis(pivaloylbenzyl) ureas. 4,011,340, Cl. 424-322.000.

Nadelson, Jeffrey, to Sandoz, Inc. Iminodimethylene di-tert-alkylophenones and phenols. 4,011,344, Cl. 424-330.000.

Nadir, Mark T., to Ridan Computers, Inc. Computer and communications systems employing new architectures. 4,011,545, Cl. 340-172.500.

Naegeli, Peter, to Givaudan Corporation. Method for the manufacture of 2,6,10,10-tetramethyl-1-oxaspiro 4,5-dec-6-ene. 4,011,245, Cl. 260-346.10R.

Naf, Ferdinand; and Ohloff, Gunther, to Firmenich S.A. Process for the preparation of sesquiterpenic derivatives. 4,011,269, Cl. 260-617.00R.

Nagai, Haruo: *See*—
Nishida, Takashi; Ninagawa, Yoichi; Itoi, Kazuo; Omura, Yutaka; and Nagai, Haruo, 4,011,277.

Nagata, Minoru: *See*—
Kubo, Masaharu; Nagata, Minoru; and Kosa, Yasunobu, 4,011,581.

Naito, Masaharu; and Nomura, Kazuhiko, to Yamaha, Hatsudoki Kabushiki Kaisha. Hydraulic shock absorber. 4,010,829, Cl. 188-278.000.

Najer, Henry: *See*—
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Nakamura, Ryuichi: *See*—
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Nakano, Gregory; Orillo, Stephen, Jr.; Uyetake, Tadao; and Higa, Teikichi, to United States of America, Navy. Drilling machine. 4,011,024, Cl. 408-79.000.

Nalco Chemical Company: *See*—
Lorenc, Walter F.; and Joneson, Dean H., 4,011,171.

Napier, Eunice Jean, to Glaxo Laboratories Limited. Biochemical process. 4,011,136, Cl. 195-31.00R.

Narco Scientific Industries, Inc.: *See*—
Ferrara, John M., 4,011,503.

National Forge Company: *See*—
Witkin, Donald Eli; and Crum, Andrew Stephenson Dalgleish, 4,011,430.

Nattrass, Frank; and Nattrass, Peter Johnson. Bulk containers. 4,010,784, Cl. 150-1.000.

Nattrass, Peter Johnson: *See*—
Nattrass, Frank; and Nattrass, Peter Johnson, 4,010,784.

Naugle, George Henry: *See*—
Eilenberg, Jon Arthur; and Naugle, George Henry, 4,010,676.

NCR Corporation: *See*—
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Phelps, Robert A.; and Horst, William R., 4,011,435.

Need, Omar U., III: *See*—
Gipstein, Edward; Moreau, Wayne M.; and Need, Omar U., III, 4,011,351.

Neefe, Charles W. Bifocal lens which positions within the anterior chamber. 4,010,496, Cl. 3-13.000.

Nelson, Iver L., to Hoerner Waldorf Corporation. Apparatus for closing and sealing two-piece slotted containers. 4,010,597, Cl. 53-374.000.

Nelson, Kenneth E., to Waters Associates, Incorporated. Novel photometric system. 4,011,451, Cl. 250-343.000.

Nelson, Norman A., to Upjohn Company, The. Process for preparing 5-oxa prostaglandin analogs. 4,011,257, Cl. 260-473.00G.

Nelson, Peter H.; and Untch, Karl G., to Syntex (U.S.A.) Inc. An intermediate in the preparation of 2-(5H-dibenzo[a,d]cyclophepten-5-on-2-yl)acetic, propionic and butyric acids. 4,011,241, Cl. 260-348.00R.

Nelson, Peter H.; and Untch, Karl G., to Syntex (U.S.A.) Inc. Intermediate in the oxidative process for the preparation of 2-(5H-dibenzo[a,d]cyclohepten-5-on-2-yl)acetic, propionic and butyric acids. 4,011,243, Cl. 260-340.900.

Nelson, Richard Clay. Cell game. 4,010,955, Cl. 273-134.00C.

Nemes, Laszlo: *See*—
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Nercessian, Sarkis, to Forbro Design Corporation. Voltage/current regulated power supply for very high output currents. 4,011,497, Cl. 323-4.000.

Newell, William H.: *See*—
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Newton, Richard P.: *See*—
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Neyret, Jacques: *See*—
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Nicholson, Charles B., to Albany International Corporation. Lubricated suction box cover. 4,011,131, Cl. 162-279.000.

Nihon Denshi Kabushiki Kaisha: *See*—
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Nihon Spindle Seizo Kabushiki Kaisha: *See*—
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Nihon Technical Kabushiki Kaisha: *See*—
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Nii, Hiroshi: *See*—
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Nippon Ekika Seikei Kabushiki Kaisha: *See*—
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Nippon Kokan Kabushiki Kaisha: *See*—
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Nippon Risui Kagaku Kenkyusho: *See*—
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Nishida, Takashi; Ninagawa, Yoichi; Itoi, Kazuo; Omura, Yutaka; and Nagai, Haruo, to Kuraray Co., Ltd.; and Kyowa Gas Chemical Industry Co., Ltd. Preparation of squalane by hydrogenolysis. 4,011,277, Cl. 260-676.00R.

Nishii, Yasuho; Hata, Shun-ichi; Wakabayashi, Kiyoshige; Mizuno, Koji; Yoshida, Akio; and Shindo, Minoru, to Chugai Seiyaku Kabushiki Kaisha. Phthalazine derivatives and salts thereof. 4,011,219, Cl. 260-250.00P.

Nishimura, Kunio: *See—*
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Nishino, Haruo: *See—*
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Nishiyama, Shigeyuki; Orii, Yoshio; Tsurumi, Kotaro; and Nishimura, Kunio, to Nihon Spindle Seizo Kabushiki Kaisha. Apparatus for automatically supplying cops to a thread winder. 4,010,907, Cl. 242-35.50A.
Nissen, Roland N. Apparatus for rebeveling spiral knives. 4,010,576, Cl. 51-249.000.
Nixon, Roy. Template for and method of cutting composition shingles for rapid and scrap-free installation. 4,010,592, Cl. 52-748.000.
Noddings, John; and Hunt, Norman, to Associated Engineering Limited. Speed responsive systems. 4,010,674, Cl. 91-47.000.
Nomura, Kazuhiko: *See—*
Naito, Masaharu; and Nomura, Kazuhiko, 4,010,829.
Noomen, Arie; and Schuurink, Pieter H. J., to Akzo N.V. Applicator stick. 4,011,311, Cl. 424-65.000.
Noothout, Arend Jaman; and Votocek, Otakar, to Reactor Centrum Nederland. Manufacture of microglobules. 4,011,289, Cl. 264-.500.
North Electric Company: *See—*
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Nozik, Arthur Jack, to Allied Chemical Corporation. Photoelectrolysis of water by solar radiation. 4,011,149, Cl. 204-129.000.
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Nusbaum, Max J. Hole cutting apparatus. 4,010,543, Cl. 30-316.000.
Nyman, Bror Goran; Leimala, Raimo Juhani; and Back, Erik Gustav, to Outokumpu Oy. In-situ pH measurement of organic-continuous solvent extraction processes. 4,011,297, Cl. 423-24.000.
Oas, David C.; and Kmentt, Waldemar E., to Beloit Corporation. Parison transfer device. 4,011,039, Cl. 425-397.000.
O'Doherty, George O. P., to Eli Lilly and Company. Ring-substituted N-(2,2-difluoroalkanoyl)-o-phenylenediamine insecticides. 4,011,341, Cl. 424-324.000.
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Ohsumi, Atushi: *See—*
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Okamoto, Toyoo; Suzuki, Takashi; and Maruta, Keiichi, to Kabushiki Kaisha Ricoh. Apparatus for forming a uniform liquid film on a roller. 4,011,353, Cl. 427-194.000.
Okazaki, Hisayoshi: *See—*
Kamatani, Yoshio; Okazaki, Hisayoshi; Imai, Ko; Fujita, Noriaki; Yamazaki, Yoshio; and Ogino, Katsuhiko, 4,011,135.
O'Keefe, Michael Francis; Schwenk, Dennis Penrose; Laudig, Ronald Clair; and Shannon, Suel Grant, to AMP Incorporated. Phono plug. 4,010,538, Cl. 29-630.00A.
Okuzawa, Yasutoshi, to Fuji Photo Film Co., Ltd. View finder for cameras. 4,011,571, Cl. 354-219.000.
Oldham, Robert R.; Wooddell, John H.; and Cain, Arthur L., to Robert R. Oldham, Inc. Pivotable fluid diverter for recirculation system. 4,011,162, Cl. 210-121.000.
Olin Corporation: *See—*
Stitzel, Harry, 4,011,042.
van Leuwen, Bruce G.; and Pitts, James J., 4,011,181.
Olsen, Everett O., to Foxboro Company, The. Signal-responsive apparatus having magnetic-particle-friction memory. 4,011,510, Cl. 324-157.000.
Olszanski, Theodore W.: *See—*
Tomczuk, Zygmunt; Olszanski, Theodore W.; and Battles, James E., 4,011,372.
O'Meara, Thomas R., to Hughes Aircraft Company. Optical array active radar imaging technique. 4,011,445, Cl. 250-199.000.
Omron Tateisi Electronics Co.: *See—*
Tanimura, Shigeru; Yamamura, Nobuyuki; and Koide, Masanobu, 4,011,577.
Tateisi, Kazuma; Horii, Sizuka; and Uchida, Yasuo, 4,011,433.
Omura, Yutaka: *See—*
Nishida, Takashi; Ninagawa, Yoichi; Itoi, Kazuo; Omura, Yutaka; and Nagai, Haruo, 4,011,277.
O'Neill, Cormac G., to PZ Technology, Inc. Piezoelectric stack insulation. 4,011,474, Cl. 310-8.700.
Opidryochimie: *See—*
Dalle, Jean-Paul; and Vaesken, Maryvonne, 4,011,043.
Orain, Michel, to Glaenzer Spicer. Sliding homokinetic joint. 4,010,625, Cl. 64-21.000.
Orii, Yoshio: *See—*
Nishiyama, Shigeyuki; Orii, Yoshio; Tsurumi, Kotaro; and Nishimura, Kunio, 4,010,907.
Orillo, Stephen, Jr.: *See—*
Nakano, Gregory; Orillo, Stephen, Jr.; Uyetake, Tadao; and Higa, Teikichi, 4,011,024.
Orlando, Anthony W., to International Business Machines Corporation. Internal division actuation of ventilated floppy disk stack. 4,011,590, Cl. 360-99.000.
Orlando, Anthony W.; and Weidenhammer, James A., to International Business Machines Corporation. Internal division actuation of ventilated floppy disk stack. 4,011,591, Cl. 360-99.000.
Osamu, Akashi; and Masazo, Nakamura. Apparatus for manufacture of continuous hinge. 4,010,524, Cl. 29-11.000.
Oster, Frank: *See—*
DiSanti, Nicholas; and Oster, Frank, 4,011,407.
Osterholt, Anthony H. Molded part separation and storage. 4,010,596, Cl. 53-123.000.
Osti, Alberto: *See—*
De Feo, Francesco; Gonzati, Franco; and Osti, Alberto, 4,011,224.
De Feo, Francesco; Gonzati, Franco; and Osti, Alberto, 4,011,227.
Otto Boch Orthopadische Industries KG: *See—*
Horvath, Eduard, 4,010,495.
Otto, Ferdinand P.: *See—*
Chibnik, Sheldon; and Otto, Ferdinand P., 4,011,167.
Otto, Friedrich, to A. Stephan U. Sohne GmbH & Co. Machine for making and kneading dough. 4,010,932, Cl. 259-6.000.
Otto, Heinz, to Volkswagenwerk Aktiengesellschaft. Bearing arrangement for a vehicle wheel. 4,010,986, Cl. 308-16.000.
Oughton, Charles D.; and Bradley, Edward T., to Colorkrome, Inc. Electrophotographic camera. 4,011,568, Cl. 354-3.000.
Oulton, David B., to Pylon Electronic Development Company Ltd. Tone operated switching arrangement. 4,011,486, Cl. 361-182.000.
Outokumpu Oy: *See—*
Blomqvist, Seppo Ilmari; Lilja, Launo Leo; Makitalo, Valto Johannes; Relander, John Henrik; Honkaniemi, Matti Ellas; and Tuovinen, Frans Heikki, 4,011,290.
Nyman, Bror Goran; Leimala, Raimo Juhani; and Back, Erik Gustav, 4,011,297.
Ouwerkerk, Cornelis: *See—*
Gawne, George; and Ouwerkerk, Cornelis, 4,011,284.
Owens-Corning Fiberglas Corporation: *See—*
Patterson, John L., 4,010,908.
Owens-Illinois, Inc.: *See—*
Ashcroft, Richard I., 4,011,122.
Griffith, Edwin D., 4,011,347.
McCollister, Howard L., 4,011,091.
Miller, James Granville, 4,010,946.
Veres, Frank, 4,011,093.
Ox, Nikolai Alexandrovich: *See—*
Filippov, Jury Vasilievich; Vendillo, Vsevolod Petrovich; and Ox, Nikolai Alexandrovich, 4,011,165.
Oxenreider, Terry Russel, to General Battery Corporation. Epoxy sealed lead battery probe and method for inserting same. 4,010,537, Cl. 29-623.200.
Packer, Samuel: *See—*
Lambrecht, Richard M.; Packer, Samuel; Merrill, Jerald C.; Atkins, Harold L.; Wolf, Alfred P.; and Bradley-Moore, Patrick R., 4,011,307.
Paice, Derek A.; and Shimp, Alan B., to United States of America, Interior. Undervoltage release with electrical reset for circuit breaker. 4,011,484, Cl. 361-59.000.
Paivinen, John O.; and Eisenhower, Walter D., to MOS Technology, Inc. Field inversion control for N-channel device integrated circuits. 4,011,105, Cl. 148-1.500.
Palmer, Patsy B.; and Tolnai, Julius L., to Price Pfister Brass Mfg. Co. Two part lip sealing mixing valve for lavatories, sinks, etc. 4,010,772, Cl. 137-625.170.
Panigrahi, Godavarish, to Burroughs Corporation. Three phase charge-coupled device memory with inhibit lines. 4,011,548, Cl. 340-173.0CA.
Papa, Sisto: *See—*
De Feo, Francesco; Papa, Sisto; and Traverso, Enrico, 4,011,209.

Papineau, Jean Guy. Citrus fruit peeling implement. 4,010,541, Cl. 30-123.700.

Papst-Motoren KG: *See—*
Schmider, Fritz, 4,011,475.

Parke, Davis & Company: *See—*
Hayes, Robert L.; and Gould, Joseph C., 4,010,877.

Parker, Roger Alan, to Richardson-Merrell Inc. Substituted thiophenecarboxylic acid and esters as hypolipidemic agents. 4,011,333, Cl. 424-275.000.

Parker, Roger Alan, to Richardson-Merrell Inc. Use of substituted furan and thiophene carboxaldehydes as hypolipidemic agents. 4,011,334, Cl. 424-275.000.

Parnkopf, Fiske O.; and Good, George E., to C F Braun & Co. Heat exchanger. 4,010,797, Cl. 165-159.000.

Parsons, David Charles; Parsons, Wendy Anne; Pigott, Norman Brian; and Foster, Alan Ernest, to S.S.B. (Aerial Fixings) Limited. Attachment for brickwork. 4,010,924, Cl. 248-225.300.

Parsons, James Henry. Safety match book. 4,010,846, Cl. 206-108.000.

Parsons, Wendy Anne: *See—*
Parsons, David Charles; Parsons, Wendy Anne; Pigott, Norman Brian; and Foster, Alan Ernest, 4,010,924.

Particle Measuring Systems, Inc.: *See—*
Knollenberg, Robert George; and Luehr, Robert E., 4,011,459.

Pastor, Sheldon Lee; and Argento, Dan J., to Minnesota Mining and Manufacturing Company. Voice logging recorder for use with preloaded cassettes. 4,011,586, Cl. 360-61.000.

Pater, Walter E.; and Rowley, James R., to PPG Industries, Inc. Front restraint device for shipping bins. 4,010,848, Cl. 206-448.000.

Pater, Walter E.; and Rowley, James R., to PPG Industries, Inc. Nestable article shipping rack having pivotally mounted end restraints. 4,010,849, Cl. 206-448.000.

Patik, Robert M. Personal clothing bag for washing machine. 4,010,785, Cl. 150-7.000.

Patsey, John A., to United States Steel Corporation. Sonic interference suppressor. 4,010,635, Cl. 73-67.80S.

Patterson, Duane M.: *See—*
Cocozella, Robert A.; Dal Pan, Florindo F.; Finelli, Thomas M.; and Patterson, Duane M., 4,010,690.

Patterson, John L., to Owens-Corning Fiberglas Corporation. Method and apparatus for handling linear elements. 4,010,908, Cl. 242-36.000.

Paulsson, Bo Gunnar. Apparatus for demonstrating electrical circuits and components. 4,010,555, Cl. 35-19.00A.

Payen, Guy: *See—*
Flix, Jean-Marie; and Payen, Guy, 4,010,900.

Peacock, Alan: *See—*
Walker, John Hirst; and Peacock, Alan, 4,010,618.

Pearce, Jack L., to Markowitz, Monte, a part interest. Radio and television alarm system. 4,011,555, Cl. 340-280.000.

Pearlman, Alan R.; and Gillette, Timothy C., to ARP Instruments, Inc. Dynamic filter. 4,011,466, Cl. 307-229.000.

Pearson, James M.; and Yanus, John F., to Xerox Corporation. 2-Vinyl-fluorenone and derivatives thereof. 4,011,266, Cl. 260-590.0FB.

Pedersen, Vernon G., to Dacor Corporation. Regulator with water fill mechanism to prevent free flow. 4,010,746, Cl. 128-147.000.

Pekkarinen, Michael O.: *See—*
Assenheimer, Robert; and Pekkarinen, Michael O., 4,011,288.

Pelletier, Claude; and Velte, Roger, to Societe Nouvelle de Roulements. Physical displacement sensing with differential capacitor. 4,011,500, Cl. 324-61.00R.

Pelletier, Guy, to Bombardier Limitee. Tire retreading. 4,011,125, Cl. 156-394.000.

Pemco, Inc.: *See—*
Feurstein, Ludwig J.; Meives, Otis E.; Schelk, Roger E.; and Verhyen, Larry L., 4,011,155.

Pendleton, Robert G.: *See—*
Kaiser, Carl; and Pendleton, Robert G., 4,011,319.

Pennebaker, William Boone, Jr.; Pennington, Keith Samuel; Seitz, Hugo Karl; and Hochberg, Frederick, deceased (by Hochberg, Lee, administratrix), to International Business Machines Corporation. Ultrasonic removal of solid impurities from recirculating ink. 4,011,157, Cl. 210-19.000.

Pennie, Walter L.: *See—*
Sundie, Richard D.; and Pennie, Walter L., 4,011,363.

Pennington, Keith Samuel: *See—*
Pennebaker, William Boone, Jr.; Pennington, Keith Samuel; Seitz, Hugo Karl; and Hochberg, Frederick, deceased, 4,011,157.

Pennwalt Corporation: *See—*
Sandler, Stanley Robert, 4,011,194.

Penrose, Alexander Ballingall: *See—*
Leeming, Michael Raymond Graves; and Penrose, Alexander Ballingall, 4,011,343.

Peremitina, Valentina Trofimovna: *See—*
Tjurin, Boris Konstantinovich; Momot, Appolon Lukich; Volodin, Nikolai Lvovich; Peremitina, Valentina Trofimovna; Evdokimova, Anna Vasilievna; Churov, Vyacheslav Petrovich; Krugly, Samuil Markovich; and Garifzyanov, Gabdulbar Garifzyanovich, 4,011,251.

Perkin-Elmer Corporation, The: *See—*
Hemstreet, Harold S.; Markle, David A.; Newell, William H.; and Offner, Abe, 4,011,011.

Perkins Engines Limited: *See—*
Stewart, William Findlay, 4,010,718.

Perkins, Thomas K.: *See—*
Kern, Loyd R.; and Perkins, Thomas K., 4,010,799.

Pernick, David. Knit garment, knit blank therefor and method of making same. 4,010,627, Cl. 66-177.000.

Perrault, R. Thomas: *See—*
Perrault, Robert Thomas, 4,010,662.

Perrault, Robert Thomas, to Perrault, R. Thomas. Flexible strap wrench. 4,010,662, Cl. 81-64.000.

Persson, Curt Hardy. Device for suspending objects. 4,010,850, Cl. 211-1.300.

Persson, Gert Artur, to Svenska Aktiebolaget Bromsregulator. Changeover valve, preferably for a railway vehicle. 4,010,771, Cl. 137-596.100.

Pesaro, Mario: *See—*
Dubs, Paul; Kuntzel, Heiner; Pesaro, Mario; and Schmidt, Harald, 4,011,233.

Peska, Jan: *See—*
Benes, Milan; and Peska, Jan, 4,011,204.

Peters, Clifford M., to W-K-M Wellhead Systems, Inc. Velocity flow control valve for fluid line. 4,010,770, Cl. 137-492.500.

Peters, Werner: *See—*
Munzner, Heinrich; Heimbach, Heinrich; Korbacher, Werner; Peters, Werner; Juntgen, Harald; Knoblauch, Karl; and Zundorf, Dieter, 4,011,065.

Peterson, Emery J. Grain drier. 4,010,552, Cl. 34-179.000.

Peterson, Francis C., to C. Hager & Sons Hinge Manufacturing Company. Door closer having means to neutralize the door closing force exerted thereby. 4,010,572, Cl. 49-386.000.

Peterson, John Paul, Jr.: *See—*
Ruiz, Carl Phillip; and Peterson, John Paul, Jr., 4,011,296.

Peterson, Marvin L.; and Cole, Charles F., Jr., to Continental Oil Company. Apparatus and method for determining moisture content in welding electrode coatings. 4,011,501, Cl. 324-65.00R.

Peterson, Per Viking, to SCA Development Aktiebolag. Method of treating refining segments. 4,011,150, Cl. 204-129.350.

Petitpierre, Jean Claude; and Garner, Robert, to Ciba-Geigy Corporation. Heterocyclic substituted chromenopyrazoles. 4,011,237, Cl. 260-310.00R.

Petree, Marcella C.: *See—*
Sochard, Irving I.; Petree, Marcella C.; Knutsen, Wallace N.; Warnock, Frederick E.; and White, Edward A., Jr., 4,010,689.

Petro-Canada Exploration Inc.: *See—*
Kern, Loyd R.; and Perkins, Thomas K., 4,010,799.

Pettibone Corporation: *See—*
Logus, Anthony T.; and Barnhart, Ronald W., 4,010,830.

Pettit, Charles E., to Simmons Gun Specialties, Inc. Shotgun with adjustable ventilated sight rib. 4,010,564, Cl. 42-1.00S.

Petty, William D.: *See—*
Boudouris, Angelo; Petty, William D.; and Simonds, Clarence S., 4,010,910.

Petzoldt, Karl; Vidic, Hans-Jorg; Prezewowsky, Klaus; Nishino, Yukishige; Wiechert, Rudolf; and Laurent, Henry, to Schering Aktiengesellschaft. 7-Hydroxyestradiols. 4,011,314, Cl. 424-241.000.

Pfizer Inc.: *See—*
Althuis, Thomas H., 4,011,324.
Carroll, Ronnie D.; Moore, Bernard S.; and Tretter, James R., 4,011,231.
Hess, Hans-Jurgen E.; Johnson, Michael R.; Bindra, Jasjit S.; and Schaaf, Thomas K., 4,011,262.
Leeming, Michael Raymond Graves; and Penrose, Alexander Ballingall, 4,011,343.

Pflugbeil, Mathias: *See—*
Dreher, Karl; Fleck, Adolf; Gotze, Christian; Ismann, Ernst; and Pflugbeil, Mathias, 4,010,912.

Phaneuf, Roland A.; and Strack, Richard R., to American Optical Corporation. Optical fiber bundle image conduit. 4,011,007, Cl. 350-96.0BC.

Phelps, Robert A.; and Horst, William R., to NCR Corporation. Optical indicia marking and detection system. 4,011,435, Cl. 235-61.11E.

Phillips Petroleum Company: *See—*
Doss, Richard C., 4,011,121.
Gilbert, Dixie E., 4,010,862.
Johnson, Marvin M.; Tabler, Donald C.; and Nowack, Gerhard P., 4,011,058.
Pollock, Lyle W.; and Dale, Glenn H., 4,010,779.

Phillips, Robert C., to Gimix, Inc. Hold circuit for telephone. 4,011,413, Cl. 179-81.00R.

Phoenix Gummiwerke A.G.: *See—*
Eichholz, Werner; and Krebs, Gerd, 4,011,126.
Eichholz, Werner; and Krebs, Gerd, 4,011,127.

Piatkowski, Philip, Jr., to Ford Motor Company. Apparatus for generating an electrical signal indicative of liquid level. 4,010,650, Cl. 73-304.00C.

Pickett, Victor W. Heavy duty denier type balance. 4,010,810, Cl. 177-157.000.

Pickin, John Harlan; Compa, Russell Edward; and Joshi, Hargovind H. Marbled detergent bars. 4,011,170, Cl. 252-134.000.

Pickles, Joseph, to Ferro Manufacturing Corporation. Seat adjusting mechanism. 4,010,927, Cl. 248-420.000.

Pieniak, Heinz A., to Johnson & Johnson. Tab fastener having substantially coplanar diverging anchoring legs. 4,010,754, Cl. 128-287.000.

Pierce, Walker L., Jr.: *See—*
Helton, Eugene L.; Gale, Preston L.; Moen, Lowell J.; Mueller, Robert C.; Pierce, Walker L., Jr.; and Vermillion, Henry J., Jr., 4,011,051.

Pietsch, Hanns: *See—*
Curts, Julius; and Pietsch, Hanns, 4,011,387.

Pigott, Norman Brian: *See—*
Parsons, David Charles; Parsons, Wendy Anne; Pigott, Norman Brian; and Foster, Alan Ernest, 4,010,924.
Pilkington Brothers Limited: *See—*
Hynd, William Christie, 4,011,070.
Simpkin, Gordon Thomas; and Ashcroft, Kenneth, 4,011,359.
Piltch, Martin S.; Rink, John P.; and Tallman, Charles R., to United States of America, Energy Research and Development Administration. Pulsed infrared difference frequency generation in $CdGeAs_2$. 4,011,462, Cl. 307-88.300.
Pimenov, Viktor Alexeevich: *See—*
Kaminsky, Igor Vasilievich; Protasov, Viktor Dmitrievich; Pimenov, Viktor Alexeevich; Barynin, Vyacheslav Alexandrovich; Shestakov, Vladimir Vladimirovich; Polyakov, Vladimir Larionovich; Severov, Genrikh Fedorovich; Zaitsev, Aron Iosifovich; and Stepanov, Stanislav Vasilievich, 4,010,906.
Pimshtein, Pavel Gdalievich; Shel, Marat Moiseevich; Khismatulin, Enver Rakhmatullovich; Borsuk, Evgeny Grigorievich; Novikov, Alexandr Nikolaevich; Makarov, Viktor Matveevich; Ziselman, Boris Grigorievich; Kuramzhin, Alexandr Valeryanovich; Usenko, Viktor Grigorievich; Globin, Nikolai Kirillovich; and Ivantsov, Vladimir Viktorovich. Multilayer pressure vessel. 4,010,864, Cl. 220-3.000.
Pinhas, Henri; and Beranger, Serge, to SERDEX - Societe d'Etudes, de Recherches, de Diffusion et d'Exploitation. Derivatives of pyridine-3-acetic acid, process for their preparation and applications thereof. 4,011,328, Cl. 424-263.000.
Pioneer Electronic Corporation: *See—*
Kawachi, Manabu, 4,011,513.
Sunaga, Yoshimitsu, 4,011,585.
Pistiner, Josef Siegfried; and Muhlfelder, Ludwig, to United States of America, Air Force. Spacecraft closed loop three-axis momentum unloading system. 4,010,921, Cl. 244-166.000.
Pitner, Alfred, to Nadella, a part interest. Method of producing a transmission device. 4,010,533, Cl. 29-523.000.
Pitts, James J.: *See—*
van Leuwen, Bruce G.; and Pitts, James J., 4,011,181.
Pladys, Nestor Leon, to Societe Francaise des Petroles BP; and Soletanche. Partially buried tanks for the storage of petroleum products. 4,010,615, Cl. 61-.500.
Plangger, David L.: *See—*
Grover, Lawrence L.; and Plangger, David L., 4,011,491.
Plank, Charles J.; Rosinski, Edward J.; and Kerr, George T., to Mobil Oil Corporation. Conversion of polar compounds using a ZSM-5 zeolite catalyst. 4,011,278, Cl. 260-682.000.
Plast-O-Matic Valves, Inc.: *See—*
De Lorenzo, Bruce L.; and McCarthy, Daniel J., 4,010,769.
Platt, Michael T.: *See—*
Zyla, Gregory J.; and Platt, Michael T., 4,010,956.
Plueddemann, John P. Polysonic electronic system for a musical instrument and methods of utilizing and constructing same. 4,010,668, Cl. 84-1.160.
Plunkett, Allan Barr: *See—*
Franz, Joseph Phillip; and Plunkett, Allan Barr, 4,011,489.
Plyler, Robert G.: *See—*
Tolnar, Emil J., Jr.; Plyler, Robert G.; and Heilman, David R., 4,010,998.
Podell, Allen F.; Young, Leo; Karp, Arthur; and Chambers, Donald R., to Stanford Research Institute. Semi-lumped element coupler. 4,011,528, Cl. 333-10.000.
Pokora, Robert J.: *See—*
Motz, Jerome C.; and Pokora, Robert J., 4,010,905.
Pollack, Jerry J.: *See—*
Reim, Thomas E.; Pollack, Jerry J.; and Kemmerling, Robert A., 4,010,857.
Pollard, Ernest. Drive belting and drive belts manufactured therefrom. 4,010,655, Cl. 74-231.00P.
Pollin, Irvin, to United States of America, Army. Method and apparatus for pulse shaping in ballistic simulators. 4,010,631, Cl. 73-12.000.
Pollock, James J., to Dow Chemical Company, The. Valve. 4,010,929, Cl. 251-260.000.
Pollock, Lyle W.; and Dale, Glenn H., to Phillips Petroleum Company. Apparatus for recovery of vapor. 4,010,779, Cl. 141-44.000.
Polyakov, Vladimir Larionovich: *See—*
Kaminsky, Igor Vasilievich; Protasov, Viktor Dmitrievich; Pimenov, Viktor Alexeevich; Barynin, Vyacheslav Alexandrovich; Shestakov, Vladimir Vladimirovich; Polyakov, Vladimir Larionovich; Severov, Genrikh Fedorovich; Zaitsev, Aron Iosifovich; and Stepanov, Stanislav Vasilievich, 4,010,906.
Pommerening, Uwe A.; and Richards, Glenn L., to Stromberg-Carlson Corporation. Timer apparatus for incrementing timing code at variable clock rates. 4,011,517, Cl. 328-130.000.
Ponticello, Ignazio S., to Eastman Kodak Company. Polymers of monomers containing active methylene groups and other ethylenically unsaturated monomers. 4,011,201, Cl. 260-65.000.
Pontius, Frank, to Western Geophysical Company of America. Multiple color light frequencies switched audio modulation. 4,011,416, Cl. 179-100.30K.
Poole, Ernest G.; and Hair, Lucius M., to Kendall Company, The. Retipped top-drive filling spindles. 4,010,600, Cl. 57-129.000.
Popp, Karl Hugo; Hess, Klaus; Simmler, Werner; Stickel, Richard; and Zuern, Ludwig, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Treatment of waste water produced in the manufacture of expandable polystyrene. 4,011,161, Cl. 210-44.000.
Porret, Daniel: *See—*
Habermeier, Jurgen; Batzer, Hans; and Porret, Daniel, 4,011,235.
Port, David John: *See—*
Powers, John Allen; MacInnis, Martin Benedict; and Port, David John, 4,011,073.
Pospischil, Reginhard, to Siemens Aktiengesellschaft. PCM regenerator. 4,011,406, Cl. 178-70.00R.
Post Office, The: *See—*
Ridout, Philip Neale; and Ridout, Ian Bruce, 4,011,405.
Powell, Charles R. Steerable trailer. 4,010,816, Cl. 180-144.000.
Powell, Emlyn John; and Brown, James Strathearn, to James Strathearn Brown. Means for retaining articles. 4,010,521, Cl. 24-258.000.
Powers, John Allen; MacInnis, Martin Benedict; and Port, David John, to GTE Sylvania Incorporated. Flame spray powder of cobalt-molybdenum mixed metal agglomerates using a molybdenum salt binder and process for producing same. 4,011,073, Cl. 75-.5BB.
PPG Industries, Inc.: *See—*
Pater, Walter E.; and Rowley, James R., 4,010,848.
Pater, Walter E.; and Rowley, James R., 4,010,849.
Preist, Donald H., to Varian Associates. Modular electron discharge device. 4,011,481, Cl. 313-302.000.
Prentice, John E. Skirt for mobile homes. 4,010,963, Cl. 280-768.000.
Presti, Biagio, to Sarkes Tarzian, Inc. Special effects generator capable of repositioning image segments. 4,011,401, Cl. 358-212.000.
Preston, Thomas A. Unipolar pacing catheter with plural distal electrodes. 4,010,755, Cl. 128-404.000.
Pretet, Georges Jean-Marie, to Etat Francais represente par le Delegue Ministeriel pour l'Armement. Towed device for measuring magnetic field and the vertical gradient thereof at sea. 4,010,706, Cl. 114-245.000.
Preti, George; and Huggins, George Richardson, to University of Pennsylvania, The Trustees of the. Method of predicting and detecting ovulation. 4,010,738, Cl. 128-2.00R.
Preus, Paul. Composition for separating hydrocarbons from water. 4,011,175, Cl. 252-427.000.
Preussag Aktiengesellschaft Metall: *See—*
Wieking, Hans Wilhelm; and Ehlers, Karl, 4,010,937.
Prezewowsky, Klaus: *See—*
Petzoldt, Karl; Vidic, Hans-Jorg; Prezewowsky, Klaus; Nishino, Yukishige; Wiechert, Rudolf; and Laurent, Henry, 4,011,314.
Price Pfister Brass Mfg. Co.: *See—*
Palmer, Patsy B.; and Tolnai, Julius L., 4,010,772.
Priesman, Herman William, to Raymond Lee Organization, The, a part interest. Automobile tray. 4,010,696, Cl. 108-19.000.
Priest, David Charles; Sandner, Michael Ray; and Trecker, David John, to Union Carbide Corporation. Bis-(1,4-beta-amino carbonyl-ethyl)-piperazines. 4,011,223, Cl. 260-268.00R.
Procter & Gamble Company, The: *See—*
Diehl, Francis Louvaine; Zeffren, Eugene; and Milbrada, Edward John, 4,011,169.
Marsan, Mario Stephen; Diehl, Francis Louvaine; and Edwards, James Byrd, 4,011,172.
Protasov, Viktor Dmitrievich: *See—*
Kaminsky, Igor Vasilievich; Protasov, Viktor Dmitrievich; Pimenov, Viktor Alexeevich; Barynin, Vyacheslav Alexandrovich; Shestakov, Vladimir Vladimirovich; Polyakov, Vladimir Larionovich; Severov, Genrikh Fedorovich; Zaitsev, Aron Iosifovich; and Stepanov, Stanislav Vasilievich, 4,010,906.
Prussin, Samuel B.: *See—*
Lozano, David S.; and Prussin, Samuel B., 4,010,872.
Puckett, Lawrence C. System for color presentation of information represented by amplitude varying video signal. 4,011,584, Cl. 358-82.000.
Pullman Transport Leasing Company: *See—*
Adler, Franklin P., 4,010,853.
Puppet Workshop, Inc., The: *See—*
Kohler, Marc W., 4,010,570.
Puritan-Bennett Corporation: *See—*
Tipple, Neil A., 4,010,761.
Puro, John Frederick, to Facet Enterprises, Inc. Return spring for teeth clutch — two stage force. 4,010,832, Cl. 192-84.00C.
Pylon Electronic Development Company Ltd.: *See—*
Oulton, David B., 4,011,486.
Pyrotector, Incorporated: *See—*
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Quaker Oats Company, The: *See—*
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Quarles, John S.: *See—*
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Quigniot, Andre. Leading link type independent systems. 4,010,813, Cl. 180-73.00C.
Quillmann, Leo-Heinz. Omnidirectional sympathetically driven sound reproduction device. 4,010,821, Cl. 181-148.000.
Quirke, Patric C., to Whitewater Electronics, Inc. Temperature sensor that is non-responsive to transient conditions. 4,011,552, Cl. 340-228.00R.
Raetz, Karlheinz. Stirling cycle heat pump. 4,010,621, Cl. 62-6.000.
Rahman, Habibur, to Massey-Ferguson Inc. Two position seat and lock. 4,010,977, Cl. 297-92.000.
Rahtz, Dieter; Wendt, Hans; and Koch, Henning, to Schering Aktiengesellschaft. Benzimidazole derivatives and process for the production thereof. 4,011,322, Cl. 424-250.000.
Rakshys, Joseph W., Jr.: *See—*
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Ralston, Philip G., to Baxter Travenol Laboratories, Inc. Flexible, collapsible container for liquids having reinforced tail portion. 4,010,783, Cl. 150-1.000.
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Rapoport Printing Corporation: *See—*
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Rapoport, Sidney L.; and Mitchell, Douglas F., to Rapoport Printing Corporation. Lithographic printing process. 4,011,085, Cl. 96-116.000.
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Rear, Ian Graeme. Rotary drill bit. 4,010,985, Cl. 308-8.200.
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Reenstra, Arthur L., to Texas Instruments Incorporated. Magnetic speed sensing mechanism. 4,011,478, Cl. 310-155.000.
Rehfeld, Arthur W., to Lawrence Peska Associates, Inc., a part interest. Latch guard. 4,010,968, Cl. 292-346.000.
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Reid, William R., Jr., to Imodco, Inc. Mooring terminal. 4,010,500, Cl. 9-8.00P.
Reim, Thomas E.; Pollack, Jerry J.; and Kemmerling, Robert A., to Republic Steel Corporation. Coal conditioning system. 4,010,857, Cl. 214-18.00R.
Reinke, Richard F. Metal roof shingle. 4,010,590, Cl. 52-533.000.
Reisman, Arnold: *See—*
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Rejeski, William E.; and D'Aprile, Paul, to Wiremold Company, The. Clamp for flexible duct. 4,010,518, Cl. 24-73.00C.
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Rese, Arkadijus; and Eberhardt, Hermann, to Eberhardt & Co. Apparatus for the automatic issuance and return of keys. 4,010,868, Cl. 221-9.000.
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Reuter, Gerald L.; and Tsuk, Andrew G., to American Home Products Corporation. Prolonged release drug form for the treatment of bovine mastitis. 4,011,312, Cl. 424-78.000.
Revillet, Georges; and Sanz, Manuel C., to Micromedic Systems, Inc. Centrifuge equipment and analytical system using it. 4,010,892, Cl. 233-23.00A.
Rexnord Inc.: *See—*
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Ridout, Ian Bruce: *See—*
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Ridout, Philip Neale; and Ridout, Ian Bruce, to Post Office, The. Digital data transmission systems. 4,011,405, Cl. 178-68.000.
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Ring, David F., to Kimberly-Clark Corporation. Inserter for delivering soft, deformable tampons into body cavities and the combination of a tampon therewith. 4,010,751, Cl. 128-263.000.
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Risman, Per Olov G., to Husqvarna Vapenfabriks AB. Electric supply circuits for a microwave oven. 4,011,427, Cl. 219-10.55B.
Ritter, Helmut, to Herberlein & Co. AG. Thread delivery device for textile machines. 4,010,883, Cl. 226-171.000.
Robar, James D. J.; and Glass, David G., to Seds Systems Ltd. Fluid conductivity detecting means. 4,010,715, Cl. 119-14.140.
Robbi, Anthony Drea, to RCA Corporation. Low energy switching circuit. 4,011,464, Cl. 307-137.000.
Robbi, Anthony Drea, to RCA Corporation. Variable range automotive radar system. 4,011,563, Cl. 343-7.0VM.
Robert Bosch G.m.b.H.: *See—*
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Rockett, Leonard R., Jr., to United States of America, Air Force. Surface potential stabilizing circuit for charge-coupled devices radiation hardening. 4,011,471, Cl. 307-308.000.
Rockland, Ronald H.; and Gobeli, David H., to Medtronic, Inc. Bipolar body tissue electrode. 4,010,758, Cl. 128-418.000.
Rockwell International Corporation: *See—*
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Rohde, Wolfgang, to Bergwerksverband GmbH. Arrangement for the treatment, particularly the drying, of particulate matter by entrainment in a gas. 4,010,551, Cl. 34-57.00R.
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Rooij, Frits, to N. V Optische Industrie "De Oude Delft". High voltage generator arrangement. 4,011,495, Cl. 321-18.000.
Root, Russell L., to Addressograph Multigraph Corporation. Apparatus for molding characters on a blank. 4,011,035, Cl. 425-121.000.
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Rosinski, Edward J.: *See*—
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Ross, Louis Anthony Ralph. Pipe cleaning method and apparatus. 4,011,100, Cl. 134-8.000.
Ross, Sigmund L., to Shuffman, Rose, executrix. Method for cryothermal fracturing of rock formations. 4,010,803, Cl. 166-303.000.
Rossell, Allen J., to Burroughs Corporation. Full cycle current detector. 4,011,507, Cl. 324-127.000.
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Rowland, Incorporated: *See*—
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Ruckel, Erwin Richard: *See*—
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Rudolph, Stephen Edward; and Glowaky, Raymond Charles, to Sherwin-Williams Company, The. Mixed starch esters and the use thereof. 4,011,392, Cl. 536-108.000.
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Russo, Angelo. Catapult basketball game. 4,010,953, Cl. 273-85.00C.
Ruter, Jorn; and Scholten, Heinz, to Chemische Werke Huls Aktiengesellschaft. Powdery coating composition. 4,011,188, Cl. 260-31.600.
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S.S.B. (Aerial Fixings) Limited: *See*—
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Sabaski, Richard E.: *See*—
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Sacomani, Louis Paul: *See*—
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Sacomani, Norma Rose; and Sacomani, Louis Paul. Food warmer and humidifier. 4,010,736, Cl. 126-369.000.
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Saka, Mehmet, to International Computers Limited. Inverter with symmetry correction circuits. 4,011,494, Cl. 321-12.000.
Sakai, Takeo; Yoneyama, Masakazu; and Yamamoto, Nobuo, to Fuji Photo Film Co., Ltd. Silver halide photographic material. 4,011,082, Cl. 96-95.000.
Sakakibara, Eiichi; Hashimoto, Iwao; and Hirohashi, Mitsuru, to Funai Pharmaceutical Industries, Ltd. S-Inosylcysteine and a process for producing the same. 4,011,221, Cl. 260-252.000.
Sakasegawa, Koji; Kunioka, Kazuo; and Ohsumi, Atushi, to Nippon Kokan Kabushiki Kaisha. Multi-sectioned cooling method for heated steel material. 4,011,112, Cl. 148-134.000.
Sakuri, Osamu; Saito, Toshio; and Kato, Masanori, to Saito, Torazo. Nozzle for injection molding of thermoplastics. 4,010,903, Cl. 239-533.100.
Sami, Hiroshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Apparatus for heating an intake manifold in an internal combustion engine. 4,010,724, Cl. 123-122.0AC.
Samour, Carlos M.; and Richards, Mildred C., to Kendall Company, The. Monomeric emulsion stabilizers. 4,011,259, Cl. 260-485.00H.
Sandell, Lionel Samuel, to Du Pont de Nemours, E. I., and Company. Vesiculated silica microspheres. 4,011,096, Cl. 106-288.00B.
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Santi, John Dominic, to Briggs & Stratton Corporation. Magnetically actuated switch for precise rapid cycle operation. 4,011,533, Cl. 335-154.000.
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Sarantakis, Dimitrios, to American Home Products Corporation. Des-(Ala^1, Gly^2,Lys^4-Srif, Des-(Ala^1, Gly^2, Lys^4)-D-Trp^8-Srif and intermediates. 4,011,207, Cl. 260-112.50S.
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Sassi, Ralph. Wiper device for arcuate and flat surfaces. 4,010,513, Cl. 15-245.000.
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Sato, Yasuhiko; Inomata, Hiroshi; and Shiobara, Toshio, to Shinetsu Chemical Company. Method for the preparation of an organohydrogenpolysiloxane as a product of a partial addition reaction. 4,011,247, Cl. 260-348.0SC.
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Saunders, Frank L.; Kangas, Donald A.; and Friedrich, Ralph E., to Dow Chemical Company, The. Electroconductive coating composition containing cationic latexes. 4,011,176, Cl. 252-500.000.
Savigny, Andre, to Societe de Vente de l'Aluminium Pechiney. Method of connecting electrical conductors and connections obtained thereby. 4,010,540, Cl. 29-630.00A.
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Sawaki, Mikio; Iwataki, Isao; Hirono, Yoshihiko; and Ishikawa, Hisao, to Nippon Soda Company Limited. Cyclohexane derivatives. 4,011,256, Cl. 260-468.00J.
Sawata, Shinji; Tani, Tatsuo; and Horigome, Takashi, to Agency of Industrial Science & Technology. Multi-stage system for accumulation of heat from solar radiant energy. 4,010,732, Cl. 126-271.000.
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Sayers, George Alvin, to Du Pont de Nemours, E. I., and Company. Hindered phenol antioxidant composition containing an amino compound. 4,011,057, Cl. 44-52.000.

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Schechter, Sheldon. Printed coupon folder. 4,010,964, Cl. 283-56.000.

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Schiks, Eduard Hendrik: *See—*
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Schiller, Robert J., to Veeder Industries, Inc. Multiple level predetermining system. 4,011,436, Cl. 235-92.0PE.

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Schindehutte, Manfred; Raquet, Erwin; and Licht, Helmut, to Fried. Krupp Huttenwerke AG. Axles resiliently mounting wheels. 4,010,972, Cl. 295-11.000.

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Schlichting, David A.: *See—*
Soldati, Gianluigi; Eilberg, Ralph G.; Melger, Helga; and Schlichting, David A., 4,011,310.

Schmider, Fritz, to Papst-Motoren KG. Torque equalized brushless permanent magnet rotor motor. 4,011,475, Cl. 310-68.00R.

Schmidt, Harald: *See—*
Dubs, Paul; Kuntzel, Heiner; Pesaro, Mario; and Schmidt, Harald, 4,011,233.

Schmidt, Harvey E.: *See—*
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Schoetensack, Wolfgang; and Riedel, Richard, to Byk Gulden Lomberg Chemische Fabrik GmbH. Hemorrhagic-lesion producing and anticoagulant-containing compositions and their use. 4,011,332, Cl. 424-273.000.

Schoettle, Klaus: *See—*
Gaiser, Dieter; Koester, Eberhard; Schoettle, Klaus; and Guenther, Friedrich, 4,011,593.

Scholin, Harold W. Apparatus using variations in magnetic force to reciprocate a linear actuator. 4,011,477, Cl. 310-80.000.

Scholten, Heinz: *See—*
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Scholtus, Christiaan Gustaaf Adolf, to Reactor Centrum Nederland. Lattice, composed of strips with connecting brackets positioned in between. 4,010,796, Cl. 165-69.000.

Schulten, Rudolf; and Knoche, Karl Friedrich, to Rheinische Braunkohlenwerke AG. Process for obtaining hydrogen and oxygen from water. 4,011,305, Cl. 423-579.000.

Schulze, Heinz: *See—*
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Schuurink, Pieter H. J.: *See—*
Noomen, Arie; and Schuurink, Pieter H. J., 4,011,311.

Schwartz, James W. Towel apparatus. 4,010,988, Cl. 312-38.000.

Schwartz, Jean; and Wermuth, Camille Georges, to Seperic. Method and composition for the treatment of hypertension with ortho-disubstituted arylguanidines. 4,011,342, Cl. 424-326.000.

Schweighofer, Hermann: *See—*
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Schwenk, Dennis Penrose: *See—*
O'Keefe, Michael Francis; Schwenk, Dennis Penrose; Laudig, Ronald Clair; and Shannon, Suel Grant, 4,010,538.

Schwindt, Jackson T., to Y-Tex Corporation. Animal identification tag. 4,010,563, Cl. 40-301.000.

Scott Paper Company: *See—*
Bastian, Lehyman John, 4,010,909.

Seachman, Ned J.: *See—*
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Sealectro Corporation: *See—*
Iantorno, James, 4,010,539.

Seds Systems Ltd.: *See—*
Robar, James D. J.; and Glass, David G., 4,010,715.

Seib, James N. Electric circuit control system using exclusive "or" gate. 4,011,482, Cl. 315-361.000.

Seidenberger, James W., to J. T. Baker Chemical Company. Spill control composition and use thereof. 4,011,098, Cl. 134-6.000.

Seitz, Hugo Karl: *See—*
Pennebaker, William Boone, Jr.; Pennington, Keith Samuel; Seitz, Hugo Karl; and Hochberg, Frederick, deceased, 4,011,157.

Sekiya, Fukuo: *See—*
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Selder, Harald, to Escher Wyss G.m.b.H. Stain removal apparatus. 4,011,027, Cl. 415-121.00B.

Self, James M., to H. H. Robertson Company. Polymerizable compositions containing unsaturated polyester resins and aqueous alkali metal silicate, method of preparing shaped articles from such compositions and thermoset products thereof. 4,011,195, Cl. 260-40.00R.

Seperic: *See—*
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SERDEX - Societe d'Etudes, de Recherches, de Diffusion et d'Exploitation: *See—*
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Ses, Incorporated: *See—*
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Setterquist, Robert Alton, to Du Pont de Nemours, E. I., and Company. Tetra(neophyl) zirconium and its use in process for the polymerization of olefins. 4,011,383, Cl. 526-154.000.

Severov, Genrikh Fedorovich: *See—*
Kaminsky, Igor Vasilievich; Protasov, Viktor Dmitrievich; Pimenov, Viktor Alexeevich; Barynin, Vyacheslav Alexandrovich; Shestakov, Vladimir Vladimirovich; Polyakov, Vladimir Larionovich; Severov, Genrikh Fedorovich; Zaitsev, Aron Iosifovich; and Stepanov, Stanislav Vasilievich, 4,010,906.

Seymour, Robert W.; and Wooten, Willis C., Jr., to Eastman Kodak Company. Molding composition comprising a blend of poly(tetramethylene terephthalate), a polyetherester and a radial teleblock copolymer. 4,011,285, Cl. 260-873.000.

Seymour, Robert W.; Shepherd, Freddie A.; and Gray, Theodore F., Jr., to Eastman Kodak Company. Polyetherester-radial teleblock copolymer blend molding composition. 4,011,286, Cl. 260-873.000.

Shannon, Suel Grant: *See—*
O'Keefe, Michael Francis; Schwenk, Dennis Penrose; Laudig, Ronald Clair; and Shannon, Suel Grant, 4,010,538.

Shaposhnikov, Igor Nikolaevich: *See—*
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Sharp, Donald L.; and Frekko, Eugene A., to United States of America, Navy. Universal binary code converter. 4,011,559, Cl. 340-347.0DD.

Sharp, Thomas L. Method of removing iron sulfide and sludge from metal surfaces. 4,011,097, Cl. 134-3.000.

Sharpless, Graham Trevor, to U.S. Philips Corporation. DC gas panel electrical display device. 4,011,558, Cl. 340-324.00M.

Shaw Industries, Inc.: *See—*
Sayman, Robert W.; Quarles, John S.; and Hamilton, Howard J., 4,010,709.

Shaw, Robert F. Method of detecting infiltration of infused liquid by comparing altered skin temperature with skin temperature in area of infiltrated liquid. 4,010,749, Cl. 128-214.00E.

Sheets, Kerney T. Projectable lawn sprinkler. 4,010,901, Cl. 239-204.000.

Shel, Marat Moiseevich: *See—*
Pimshtein, Pavel Gdalievich; Shel, Marat Moiseevich; Khismatulin, Enver Rakhmatullovich; Borsuk, Evgeny Grigorievich; Novikov, Alexandr Nikolaevich; Makarov, Viktor Matveevich; Ziselman, Boris Grigorievich; Kuramzhin, Alexandr Valeryanovich; Usenko, Viktor Grigorievich; Globin, Nikolai Kirillovich; and Ivantsov, Vladimir Viktorovich, 4,010,864.

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Shelley, Donald Percy. Kilns. 4,011,394, Cl. 13-20.000.

Shephard, Donald L., to Shepherd, Helen I., a part interest. Cut-off tool. 4,010,526, Cl. 29-96.000.

Shepherd, Freddie A.: *See—*
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Sherwin-Williams Company, The: *See—*
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Sheth, Santosh D.: *See—*
Hempel, Rod A.; Tittman, Walter P.; and Sheth, Santosh D., 4,010,728.

Shields, William D. Motorcycle fairing. 4,010,976, Cl. 296-78.100.

Shimada, Shunji; Ohba, Kenichi; and Ishii, Shigeo, to Hitachi, Ltd. Gate input circuit for insulated gate field effect transistors. 4,011,467, Cl. 307-251.000.

Shimizu, Shigemi, to Sankyo Electric Company Limited. Fluid suction and discharge apparatus. 4,011,029, Cl. 417-269.000.

Shimotake, Hiroshi: *See—*
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Short, Oliver Alton, to Du Pont de Nemours, E. I., and Company. Silver compositions. 4,011,087, Cl. 106-1.000.

Showa Densen Denran Kabushiki Kaisha: *See—*
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Shuffman, Rose, executrix: *See—*
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Shur-Lok Corporation: *See—*
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Siemens Aktiengesellschaft: *See—*
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Pospischil, Reginhard, 4,011,406.
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Siman, Alfred W., to Textron, Inc. Vibration reducing system for single cylinder fluid pressure engine. 4,010,544, Cl. 30-381.000.

Simm, Wolfgang: *See—*
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Simmler, Werner: *See—*
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Simmons Gun Specialties, Inc.: *See—*
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Simmons, John Robert, to General Electric Company. Split fan work gas turbine engine. 4,010,608, Cl. 60-226.00R.

Simond, Jacques: *See—*
Mauvernay, Roland-Yves; Monteil, Andre; Simond, Jacques; Moleyre, Jacques; and Busch, Norbert, 4,011,240.

Simonds, Clarence S.: *See—*
Boudouris, Angelo; Petty, William D.; and Simonds, Clarence S., 4,010,910.

Simons, Carel Arthur Jan; and Lam, Hendrik' T., to U.S. Philips Corporation. Apparatus for reading an optically readable reflecting information structure. 4,011,400, Cl. 358-127.000.

Simpkin, Gordon Thomas; and Ashcroft, Kenneth, to Pilkington Brothers Limited. Interleaving materials comprising particulate separator and acidic materials, for separating glass sheets. 4,011,359, Cl. 428-326.000.

Simpson, William R. J., to Sandoz, Inc. Bi-4-[1-(quinazolinyl-4)piperidyls] and bis 4-[1-(quinazolinyl-4)piperidyl]alkanes . 4,011,323, Cl. 424-251.000.

Sims, Dewey M., Jr., to Burroughs Corporation. Spacer bar mechanism. 4,010,838, Cl. 197-98.000.

Simson, Joseph Michael, to Eastman Kodak Company. Photographic emulsions and elements containing rigidized carbocyanine dyes. 4,011,086, Cl. 96-136.000.

Sinclair, William Y.: *See—*
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Singer Company, The: *See—*
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Sinha, Ashok Kumar: *See—*
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Skoda, William G.: *See—*
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Skogward, Kenneth Oscar Emanuel, to Husqvarna AB. Converter. 4,011,432, Cl. 235-61.0PE.

Slater, Robert Antony: *See—*
Coates, William John; Roe, Anthony Maitland; and Slater, Robert Antony, 4,011,321.

Slezinger, Isaak Isaevich; Belitsky, Georgy Mironovich; Shiryaev, Vladimir Alexandrovich; and Mironov, Jury Vasilievich. Piezooptical measuring transducer. 4,010,632, Cl. 73-141.00A.

Slusher, John G., to Raymond Lee Organization, Inc., The, a part interest. Golf rubber overshoe. 4,010,558, Cl. 36-7.300.

Smith, Jay, III; and Conroy, Richard F. M. Sound reproducing unit. 4,010,959, Cl. 274-23.00R.

Smith, John A.; Miller, Jack H.; Schilling, Russell C.; and North, Howard L., Jr., to Becton, Dickinson and Company. Triac centrifuge. 4,010,893, Cl. 233-24.000.

Smith, Joseph F., to Litton Systems, Inc. Warehouse system with pan transfer apparatus. 4,010,855, Cl. 214-16.40A.

Smith Kline & French Laboratories Limited: *See—*
Coates, William John; Roe, Anthony Maitland; and Slater, Robert Antony, 4,011,321.

Smith, Laurence H., to Atlas Pacific Engineering Company. Machine for orienting pears. 4,010,842, Cl. 198-394.000.

Smith, Matthew S.; and Filippi, Ernest A. Weapon arrangement. 4,010,688, Cl. 102-65.200.

Smith, Merle F.; and Wagman, Harold H. Motorcycle indicating safety light assembly. 4,011,443, Cl. 240-7.550.

Smith, Russell G., to Xomox Corporation. Piston-operated parallel-slide gate valve. 4,010,928, Cl. 251-31.000.

Smith, Thurman Dale: *See—*
Clark, Jack Phillip; Smith, Thurman Dale; and Foster, Alan Carl, 4,010,636.

Smith, William Edward, to General Electric Company. Process for preparing tetrahydrofuran. 4,011,244, Cl. 260-346.10R.

SmithKline Corporation: *See—*
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Sochard, Irving I.; Petree, Marcella C.; Knutsen, Wallace N.; Warnock, Frederick E.; and White, Edward A., Jr., to United States of America, Navy. Apparatus for sensing target distance. 4,010,689, Cl. 102-70.20P.

Societe Chimique des Charbonnages: *See—*
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Societe de Vente de l'Aluminium Pechiney: *See—*
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Societe Francaise des Petroles BP: *See—*
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Societe Immobiliere et Financiere Suchet Alfort S.I.F.S.A.: *See—*
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Societe Nouvelle de Roulements: *See—*
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Societe Seveg Etudes Equipments Graphiques: *See—*
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Solar Energy Dynamics Corporation: *See—*
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Soldati, Gianluigi; Eilberg, Ralph G.; Melger, Helga; and Schlichting, David A., to Carter-Wallace, Inc. Dental prophylaxis containing alkylamine fluorophosphates. 4,011,310, Cl. 424-52.000.

Soletanche: *See—*
Pladys, Nestor Leon, 4,010,615.

Soref, Richard A.; and Schissler, Lloyd R., to Sperry Rand Corporation. Low crosstalk optical switch. 4,011,543, Cl. 340-166.00R.

South-Co Machinery Company, Inc.: *See—*
Webb, Harley E., 4,010,700.

Southard, Robert Keith: *See—*
Hopkins, John Root; Renn, Robert Maurice; and Southard, Robert Keith, 4,010,996.

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Sperry Rand Corporation: *See—*
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Fosler, Dick E., Jr.; and Krocheski, Thomas L., 4,011,468.
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Torok, Ernest J.; and Hanson, Marlin M., 4,011,550.

Sperry-Sun, Inc.: *See—*
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Speyer, Geoffrey Edward, to Taylor & Osborne Limited. Blow guns. 4,010,902, Cl. 239-428.500.

Spiekermann, John Clements, III; Rosbe, David J.; Kulesa, Edmund M.; Kulik, James; and Brasel, David F., to Continental Group, Inc., The. End lining with hot melt. 4,010,703, Cl. 113-120.00Y.

Spinelli, Leonardo B.: *See—*
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Sprecher & Schuh AG: *See—*
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Davies, Terrence Ardern, 4,011,053.
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Staar, Theophiel Clement Jozef Lodewijk, to Staar, S.A. Automatic stop device for a magnetic tape recording and/or playback apparatus. 4,010,917, Cl. 242-188.000.
Staebler, Paul J.; Krauja, Ziedonis I.; and Goloff, Alexander, to Caterpillar Tractor Co. Engine seal assembly. 4,011,030, Cl. 418-51.000.
Staebler, Paul J.: *See—*
Hackett, David E.; and Staebler, Paul J., 4,011,031.
Stalter, Gordon R. Roof drain system. 4,010,577, Cl. 52-1.000.
Standard Brands Incorporated: *See—*
Horwath, R. Otto; Lally, John A.; and Rotheim, Philip, 4,011,139.
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Standard Oil Company (Indiana): *See—*
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West, Charles T.; and Culbertson, George S., 4,011,380.
Stanford Research Institute: *See—*
Podell, Allen F.; Young, Leo; Karp, Arthur; and Chambers, Donald R., 4,011,528.
Stangeland, Bruce E.; and Mason, Harold F., to Chevron Research Company. Production of lubricating oils. 4,011,154, Cl. 208-59.000.
Stanislaw, Peter, to Morrison Machine Co. Apparatus for drying web-like material. 4,010,522, Cl. 26-18.600.
Stanley, Robert F.; and Moore, Henry Jack, Jr., to Mor-Flo Industries, Inc. Water heater air inlet control. 4,010,735, Cl. 126-350.00R.
Stanray Corporation: *See—*
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State Electricity Commission of Victoria Commonwealth of Australia: *See—*
Llewelyn, Richard Penderell; and Hart, John Austin, 4,011,068.
Steglich, Helmar Rudolf, to General Electric Company. System for generating an angular rate signal from an angular position signal utilizing a constant amplitude-variable carrier phase signal. 4,011,440, Cl. 235-183.000.
Stehle, Heinz; and Romeiser, Hans-Jurgan, to Kraftwerk Union Aktiengesellschaft. Pressurized-coolant reactor fuel rod. 4,011,134, Cl. 176-68.000.
Steiman, Wolf. Pump for hand-held dispensers. 4,010,874, Cl. 222-321.000.
Stein, Claude; and Marbach, Andre, to Societe Chimique des Charbonnages. Method of removal of petroleum products from solid or liquid surfaces. 4,011,159, Cl. 210-40.000.
Steine, Hans T.; Wasserman, Rene; and Simm, Wolfgang, to Eutectic Corporation. Quinary silver alloy. 4,011,056, Cl. 29-199.000.
Steinemann, Robert, to Georg Fischer Aktiengesellschaft. Arrangement for the delivery of measured quantities of the molten contents of a storage vessel. 4,010,876, Cl. 222-595.000.
Steinstrasser, Ralf, to Merck Patent Gesellschaft mit beschrankter Haftung. Modified nematic mixtures with positive dielectric anisotropy. 4,011,173, Cl. 252-299.000.
Steinwart, Johannes; Bauder, Armin; and Leitermann, Wulf, to Audi NSU Auto Union Aktiengesellschaft. System for liquid cooling of a rotor or a rotary mechanism. 4,011,032, Cl. 418-84.000.
Stelz, Wolfgang: *See—*
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Stenberg, Kaj, to Gambro AG. Cooling unit. 4,010,795, Cl. 165-46.000.
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Stephens, Wilbur E., to Alumax Inc. High efficiency aluminum scrap melter and process therefor. 4,010,935, Cl. 266-44.000.
Stewart, Howard Franklin, to Dow Corning Corporation. Metal substrates with carboxyfunctional siloxane release coatings. 4,011,362, Cl. 428-447.000.
Stewart, William Findlay, to Perkins Engines Limited. Reciprocating piston engines having piston oil cooling. 4,010,718, Cl. 123-41.350.
Steyr-Daimler-Puch Aktiengesellschaft: *See—*
Kepplinger, Hannes; and Schweighofer, Hermann, 4,010,673.
Stickel, Richard: *See—*
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Stievenart, Emile Frans; and Deconinck, Hugo Frans, to AGFA-GEVAERT N.V. Photographic camera. 4,011,570, Cl. 354-89.000.
Stirling, Walter R.: *See—*
Ellis, Christopher R.; Gibbon, Richard H.; and Stirling, Walter R., 4,010,827.
Stitzel, Harry, to Olin Corporation. Oxidation of vat and sulfur dyes. 4,011,042, Cl. 8-34.000.
Stockton, William N. Modular liquid collection system for railroad roadbeds. 4,010,896, Cl. 238-2.000.
Stora Kopparbergs Bergslags Aktiebolag: *See—*
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Stout, James T.: *See—*
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Stowell Industries Inc.: *See—*
Fischer, Otto H., 4,010,774.
Strack, Richard R.: *See—*
Phancuf, Roland A.; and Strack, Richard R., 4,011,007.
Strauff, Gunther, to Langen & Co. Servo steering gear, particularly for alleviator-controlled constant pressure servo systems in motor vehicles. 4,010,815, Cl. 180-132.000.
Streeter, Albert G. Portable rivet breaking device. 4,010,532, Cl. 29-267.000.
Strike, Donald P., to American Home Products Corporation. 15-Methyl prostaglandin compounds having bronchodilating activity. 4,011,338, Cl. 424-317.000.
Stromberg-Carlson Corporation: *See—*
Pommerening, Uwe A.; and Richards, Glenn L., 4,011,517.
Strutz, Hans-Jurgen; and Jacob, Ingolf, to Hoechst Aktiengesellschaft. Process for the control of yarn tension. 4,010,915, Cl. 242-147.00R.
Strydom, Mauritz Leon, to Tobacco Research and Development Institute Limited. Cigarette rod condition determining. 4,010,762, Cl. 131-21.00B.
Sturt, Alan Charles, to BP Chemicals Limited. Polymerization process. 4,011,283, Cl. 260-880.00R.
Stutz, Herbert: *See—*
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Sugawara, Isao: *See—*
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Sugimoto, Yoshihiro; and Suzuki, Tsunefusa, to Nihon Technical Kabushiki Kaisha. Actuator for pushbutton tuner. 4,010,652, Cl. 74-10.330.
Sugimoto, Yukinobu: *See—*
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Iwasawa, Naozumi; Sugiyama, Nobuo; Yoshihara, Ichiro; Watanabe, Tadashi; and Kondo, Taizo, 4,011,381.
Sunaga, Yoshimitsu, to Pioneer Electronic Corporation. Magnetic recording reproducing system. 4,011,585, Cl. 360-25.000.
Sundberg, Erik G., to Aktiebolaget Tudor. Electric storage battery electrode, and method for its manufacture. 4,011,369, Cl. 429-140.000.
Sundie, Richard D.; and Pennie, Walter L., to Allied Chemical Corporation. Curable amino resins. 4,011,363, Cl. 428-524.000.
Sutcliffe, Grenville G., to Husky Corporation. Gasoline dispensing nozzle guard with spout enclosure and vapor return line. 4,010,781, Cl. 141-392.000.
Suziki, Katsumi; Kawatake, Katsunori; Sawada, Hiroshi; and Matsuoka, Hiroki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas cleaning apparatus for an internal combustion engine for a vehicle. 4,010,723, Cl. 123-119.00A.
Suzuki, Kazuo: *See—*
Matsumoto, Shuichi; Nakamura, Ryuichi; Fukuhara, Seiji; Suzuki, Kazuo; and Komatsu, Koei, 4,011,386.
Suzuki, Shigemasa, to Nippon Ekika Seikei Kabushiki Kaisha. Apparatus for forming a cross-oriented film. 4,011,128, Cl. 156-500.000.
Suzuki, Takashi: *See—*
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Svensson, Leif Ake: *See—*
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Swain, Fabian F. Device for providing proper laying of cable on the drum of a crane. 4,010,916, Cl. 242-157.100.
Swanberg, Melvin E., to Xerox Corporation. Device for producing a signal indicating the directional movement required to achieve focus. 4,011,446, Cl. 250-201.000.
Swank, Robert K.: *See—*
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Swanson, Kenneth P. Textile drafting roll assembly. 4,010,527, Cl. 29-116.00R.

Sybron Corporation: *See—*
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Syntex (U.S.A.) Inc.: *See—*
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Szala, Lawrence E.: *See—*
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Tabler, Donald C.: *See—*
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Tagawa, Takashi; and Mori, Jun-Ichi, to Nihon Denshi Kabushiki Kaisha; and Unitika Ltd. Scanning electron device. 4,011,450, Cl. 250-311.000.

Takahashi, Asao: *See—*
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Takakura, Yutaka: *See—*
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Takashima, Masaru, to Aikoh Co., Ltd. Process for tapping a steel-making converter. 4,010,936, Cl. 266-45.000.

Takayanagi, Kiyoshi: *See—*
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Take, Tsugio: *See—*
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Takechi, Hiroshi; Masui, Hiroaki; Fujii, Chikara; Kawano, Tsuyoshi; and Koyama, Kazuo, to Nippon Steel Corporation. Hot-rolled steel sheet of high cold formability and method of producing such steel sheet. 4,011,106, Cl. 148-2.000.

Takeda Chemical Industries, Ltd.: *See—*
Horii, Satoshi; Kameda, Yukihiko; Iwasa, Takashi; and Yamamoto, Hiroichi, 4,011,391.
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Takekoshi, Tohru; and Kochanowski, John E., to General Electric Company. Method for making polyetherimides. 4,011,198, Cl. 260-47.0CP.

Takematsu, Hikaru, to Iwatsu Electric Co., Ltd. Call circuit for key telephone system for giving direct station selection call priority over station call. 4,011,415, Cl. 179-99.000.

Takemura, Yozo; Hirayama, Kouich; and Kikuci, Yoshiyuki, to Nippon Steel Corporation. Method for changing width of cast slabs during continuous casting. 4,010,793, Cl. 164-82.000.

Tallman, Charles R.: *See—*
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Tamborski, Christ, to United States of America, Air Force. Fluoroalkyleneether difunctional compounds. 4,011,255, Cl. 260-465.600.

Tamborski, Christ; and Snyder, Carl E., Jr., to United States of America, Air Force. Perfluoroalkylether substituted aryl phosphines and their synthesis. 4,011,267, Cl. 260-606.50P.

Tani, Tatsuo: *See—*
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Tanimura, Shigeru; Yamamura, Nobuyuki; and Koide, Masanobu, to Omron Tateisi Electronics Co. Mechanical-electrical force transducer with semiconductor-insulating layer-tin oxide composite. 4,011,577, Cl. 357-26.000.

Tanton, George A., to United States of America, Army. Polarization rotation analyzer. 4,011,014, Cl. 356-116.000.

Taplin, Lael Brent, to Bendix Corporation, The. Fuel control system having an auxiliary circuit for correcting the signals generated by the pressure sensor during transient operating conditions. 4,010,717, Cl. 123-32.0EH.

Tate & Lyle Limited: *See—*
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Tateisi, Kazuma; Horii, Sizuka; and Uchida, Yasuo, to Omron Tateisi Electronics Co. Value dispensing system. 4,011,433, Cl. 235-61.70B.

Taub Family Trust U/A dated 9/1/67: *See—*
Taub, Ronald H., 4,010,698.

Taub, Ronald H., to Taub Family Trust U/A dated 9/1/67. Multi-shelved display assembly. 4,010,698, Cl. 108-111.000.

Taylor, John S., to Tifcon Company. Tobacco curing and drying apparatus. 4,011,041, Cl. 432-21.000.

Taylor & Osborne Limited: *See—*
Speyer, Geoffrey Edward, 4,010,902.

Technar Incorporated: *See—*
Bell, Lon E.; and Diller, Robert W., 4,011,536.

Tecumseh Products Company: *See—*
Aggen, Glenroy Newcomb, 4,011,120.

Teletype Corporation: *See—*
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Telkes, Maria, to University of Delaware, The. Cooling system. 4,010,620, Cl. 62-2.000.

Telkes, Maria, to Ses, Incorporated. Selective black for absorption of solar energy. 4,011,190, Cl. 260-33.65B.

Temple University: *See—*
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Terada, Osamu; and Uwajima, Takayuki, to Kyowa Hakko Kogyo Co., Ltd. Process for the preparation of cholesterol esterase. 4,011,138, Cl. 195-65.000.

Terao, Shinji; Shiraishi, Mitsuru; Miyawaki, Toshio; Minamida, Isao; Yamaoka, Masayoshi; and Numata, Mitsuo, to Takeda Chemical Industries, Ltd. 3-(Morpholinoalkoxyiminomethyl)cephem compounds. 4,011,214, Cl. 260-240.00G.

Terry, R. C.: *See—*
Terry, Ruel C., 4,010,801.

Terry, Ruel C., to In Situ Technology, Inc. Producing thin seams of coal in situ. 4,010,800, Cl. 166-258.000.

Terry, Ruel C., to Terry, R. C. Method of and apparatus for in situ gasification of coal and the capture of resultant generated heat. 4,010,801, Cl. 166-261.000.

Tesch, Bernhard. Jointed link band. 4,010,604, Cl. 59-82.000.

Testa, Raymond: *See—*
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Texaco Development Corporation: *See—*
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Texas Instruments Incorporated: *See—*
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Textron, Inc.: *See—*
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Thaler, Richard, to Sprecher & Schuh AG. Gas-blast switch. 4,011,421, Cl. 200-148.00A.

Theurer, Josef; and Folser, Karl, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H. Ballast leveling apparatus. 4,010,691, Cl. 104-7.00A.

Thomas, Robert M. Communication system interface circuits. 4,011,410, Cl. 179-2.50R.

Thompson, Edward J.: *See—*
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Thompson, Geoffrey F., to Syntex (U.S.A.) Inc. Medicament preparations. 4,011,313, Cl. 424-227.000.

Thompson, George H. B.; and Lovelace, David F., to International Standard Electric Corporation. Method of making injection lasers by epitaxial deposition and selective etching. 4,011,113, Cl. 148-175.000.

Thompson, Kenneth N.; Johnson, Richard A.; and Lloyd, Norman E., to Standard Brands Incorporated. Process for producing dextrose using mixed immobilized enzymes. 4,011,137, Cl. 195-31.00R.

Thomson-CSF: *See—*
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Tipple, Neil A., to Puritan-Bennett Corporation. Delivery means for use in volume-controlled respiration apparatus. 4,010,761, Cl. 128-145.600.

Titan Manufacturing Company Proprietary Limited, The: *See—*
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TM Systems, Inc.: *See—*
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Tobacco Research and Development Institute Limited: *See—*
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Tokyo Shibaura Electric Company, Ltd.: *See—*
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Tolnai, Julius L.: *See—*
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Tolnar, Emil J., Jr.; Plyler, Robert G.; and Heilman, David R., to General Motors Corporation. Matable electrical connector means with inertia lock. 4,010,998, Cl. 339-91.00R.
Tomalia, Donald A.; and Zubritsky, Elizabeth A., to Dow Chemical Company, The. Novel reaction products of allyl halides or vinylbenzyl halides with oxazolines (or oxazines). 4,011,376, Cl. 526-11.100.
Toman, Kurt, to United States of America, Air Force. Method of determining ionospheric reflection height. 4,011,565, Cl. 343-112.00A.
Tomczuk, Zygmunt; Olszanski, Theodore W.; and Battles, James E., to United States of America, Energy Research and Development Administration. Method of preparing a negative electrode including lithium alloy for use within a secondary electrochemical cell. 4,011,372, Cl. 429-218.000.
Tomlinson, George Herbert, II, to Domtar Limited. Pulp mill recovery system. 4,011,129, Cl. 162-30.00K.
Torok, Ernest J.; and Hanson, Marlin M., to Sperry Rand Corporation. Method of improving the operation of a single wall domain memory system. 4,011,550, Cl. 340-174.0TF.
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Trapasso, Louis E., to Celanese Corporation. Polygalactomannan gum formate esters. 4,011,393, Cl. 536-114.000.
Traugott, Allan Michael; and Traugott, Lony P. Wallet. 4,010,787, Cl. 150-35.000.
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Treharne, Richard W.; and McKibben, Charlton K., to Charles F. Kettering Foundation. Method and apparatus for home production and application of nitrogen fertilizer. 4,010,897, Cl. 239-8.000.
Tremblay, Ronaldo Joseph, to Domtar Limited. Smelt spout for recovery boiler. 4,011,047, Cl. 23-252.00R.
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Lockwood, Robert J.; Reymore, Harold E., Jr.; and Thompson, Edward J., 4,011,180.
Morozowich, Walter, 4,011,249.
Nelson, Norman A., 4,011,257.

Uram, Robert, to Westinghouse Electric Corporation. Accurate, stable and highly responsive gas turbine startup speed control with fixed time acceleration especially useful in combined cycle electric power plants. 4,010,605, Cl. 60-39.140.

Usenko, Viktor Grigorievich: *See—*
Pimshtein, Pavel Gdalievich; Shel, Marat Moiseevich; Khismatulin, Enver Rakhmatullovich; Borsuk, Evgeny Grigorievich; Novikov, Alexandr Nikolaevich; Makarov, Viktor Matveevich; Ziselman, Boris Grigorievich; Kuramzhin, Alexandr Valeryanovich; Usenko, Viktor Grigorievich; Globin, Nikolai Kirillovich; and Ivantsov, Vladimir Viktorovich, 4,010,864.

Uwajima, Takayuki: *See—*
Terada, Osamu; and Uwajima, Takayuki, 4,011,138.

Uyetake, Tadao: *See—*
Nakano, Gregory; Orillo, Stephen, Jr.; Uyetake, Tadao; and Higa, Teikichi, 4,011,024.

Uzgiris, Egidijus E., to General Electric Company. Use of laser speckle patterns for measurement of electrophoretic mobilities. 4,011,044, Cl. 23-230.00B.

Vaesken, Maryvonne: *See—*
Dalle, Jean-Paul; and Vaesken, Maryvonne, 4,011,043.

Vanden Bosch, Paul G. Pipe coupler. 4,010,966, Cl. 285-403.000.

van der Leeuw, Bart: *See—*
Jacobs, Cornelis Adrianus Joannes; and van der Leeuw, Bart, 4,011,480.

van der Pol, Ronald: *See—*
Bonfig, Karl Walter; Hofmann, Friedrich; Stelz, Wolfgang; and van der Pol, Ronald, 4,010,644.

Van Deventer, Gijsbrecht Coenraad; and Visser, Gerard Adriaan, to N.K.F. Kabel B.V. Gas-filled high-voltage cable built up of rigid segments. 4,011,396, Cl. 174-11.00R.

Van Gompel, James J., to Brammall, Inc. Bolt seal. 4,010,788, Cl. 151-2.00A.

van Leuwen, Bruce G.; and Pitts, James J., to Olin Corporation. Polyurethane foams containing stannous catechol derivatives. 4,011,181, Cl. 260-2.5AB.

Van Malderghem, Edmund G.: *See—*
Allen, Robert H.; Van Malderghem, Edmund G.; Robertson, Victor J.; and Shook, William C., 4,010,889.

van Reijendam, Jan W.; and van Schooten, Jan, to Shell Oil Company. Bitumen-polymer composition. 4,011,184, Cl. 260-28.50R.

van Schooten, Jan: *See—*
van Reijendam, Jan W.; and van Schooten, Jan, 4,011,184.

VanWicklin, Warren A., Jr.: *See—*
Muller, George H.; and VanWicklin, Warren A., Jr., 4,010,659.

Varga, John. Slatted window assembly. 4,010,790, Cl. 160-133.000.

Varian Associates: *See—*
Preist, Donald H., 4,011,481.

Vassiliou, Eustathios; and Concannon, Thomas P., to Du Pont de Nemours, E. I., and Company. Fluoropolymer coating compositions having improved adhesion. 4,011,361, Cl. 428-422.000.

Veeder Industries, Inc.: *See—*
Schiller, Robert J., 4,011,436.

Velte, Roger: *See—*
Pelletier, Claude; and Velte, Roger, 4,011,500.

Vendillo, Vsevolod Petrovich: *See—*
Filippov, Jury Vasilievich; Vendillo, Vsevolod Petrovich; and Ox, Nikolai Alexandrovich, 4,011,165.

Veres, Frank, to Owens-Illinois, Inc. Sealant for glass-ceramic surfaces. 4,011,093, Cl. 106-52.000.

Verhyen, Larry L.: *See—*
Feurstein, Ludwig J.; Meives, Otis E.; Schelk, Roger E.; and Verhyen, Larry L., 4,011,155.

Vermillion, Henry J., Jr.: *See—*
Helton, Eugene L.; Gale, Preston L.; Moen, Lowell J.; Mueller, Robert C.; Pierce, Walker L., Jr.; and Vermillion, Henry J., Jr., 4,011,051.

Vicar Industries Incorporated: *See—*
Mahnke, Carl F., Jr., 4,010,858.

Victor Company of Japan, Limited: *See—*
Hishiki, Hideo; Yamaguchi, Shiyousaku; and Miyazaki, Akihisa, 4,010,535.

Vidakovic, Aleksandar; and Anderson, Rodney H., to International Harvester Company. Anchor plate tire. 4,010,789, Cl. 152-182.000.

Vidic, Hans-Jorg: *See—*
Petzoldt, Karl; Vidic, Hans-Jorg; Prezewowsky, Klaus; Nishino, Yukishige; Wiechert, Rudolf; and Laurent, Henry, 4,011,314.

Vilaghy, Miklos I.; and Zellerman, Gabor. Bone biopsy instrument kit. 4,010,737, Cl. 128-2.00B.

Vilhuber, Heinz Georg: *See—*
Amann, August; Vilhuber, Heinz Georg; Kunze, Johannes; Giertz, Hubert; and Franke, Albrecht, 4,011,336.

Vinson, Robert P.: *See—*
Kissell, Fred N.; and Vinson, Robert P., 4,010,647.

Visockis, Joseph N. Baseball batting practice apparatus. 4,010,950, Cl. 273-26.00E.

Visser, Gerard Adriaan: *See—*
Van Deventer, Gijsbrecht Coenraad; and Visser, Gerard Adriaan, 4,011,396.

Vissers, Donald R.: *See—*
Kaun, Thomas D.; Vissers, Donald R.; and Shimotake, Hiroshi, 4,011,373.

Vitatron Medical B.V.: *See—*
Boer, Gerard B. M., 4,010,759.

Vivian, Lloyd R., Jr.: *See—*
Muller, George H.; and Vivian, Lloyd R., Jr., 4,010,658.

Vogt, Guilfred L.: *See—*
Betsill, Harry E.; Levin, Charles J.; and Vogt, Guilfred L., 4,011,499.

Volkrodt, Wolfgang, to Siemens Aktiengesellschaft. Stator construction for a permanent magnet-excited d-c machine. 4,011,479, Cl. 310-186.000.

Volkswagenwerk Aktiengesellschaft: *See—*
Otto, Heinz, 4,010,986.

Volodin, Nikolai Lvovich: *See—*
Tjurin, Boris Konstantinovich; Momot, Appolon Lukich; Volodin, Nikolai Lvovich; Peremitina, Valentina Trofimovna; Evdokimova, Anna Vasilievna; Churov, Vyacheslav Petrovich; Krugly, Samuil Markovich; and Garifzyanov, Gabdulbar Garifzyanovich, 4,011,251.

von Wietersheim, Klaus; Maertzdorf, Bastiaan; and Schiks, Eduard Hendrik, to Mayfran Incorporated. Apparatus for the treatment of chips. 4,010,881, Cl. 225-100.000.

Votocek, Otakar: *See—*
Noothout, Arend Jaman; and Votocek, Otakar, 4,011,289.

W. B. McGuire Co., Inc.: *See—*
McGuire, Winston B.; and Mellyn, Charles W., 4,010,571.

W-K-M Wellhead Systems, Inc.: *See—*
Peters, Clifford M., 4,010,770.

Waddill, Harold George; and Schulze, Heinz, to Texaco Development Corporation. Polyether thiourea epoxy curing agents. 4,011,281, Cl. 260-830.00S.

Wagman, Gerald H.: *See—*
Weinstein, Marvin J.; Daniels, Peter J. L.; Wagman, Gerald H.; and Testa, Raymond, 4,011,390.

Wagman, Harold H.: *See—*
Smith, Merle F.; and Wagman, Harold H., 4,011,443.

Wagner, Hans; and Maierhofer, Alfred, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the production of N-acetyl-L-methionine. 4,011,263, Cl. 260-534.00S.

Wagner, Horst Richard: *See—*
Ansari, Hifzur Rahman; Fido, Paul Edgar; and Wagner, Horst Richard, 4,011,177.

Wagner, Stan. Sideburn trimming guide. 4,010,764, Cl. 132-45.00R.

Wakabayashi, Kiyoshige: *See—*
Nishii, Yasuho; Hata, Shun-ichi; Wakabayashi, Kiyoshige; Mizuno, Koji; Yoshida, Akio; and Shindo, Minoru, 4,011,219.

Waki, Misao: *See—*
Hosokawa, Etsuo; Waki, Misao; and Asada, Katsumi, 4,011,185.

Walker, John Hirst; and Peacock, Alan, to Dowty Mining Equipment Limited. Mine roof support. 4,010,618, Cl. 61-45.00D.

Waller, Alan Hugh; and Sangway, Peter Charles, to Ciba-Geigy AG. Phosphor screen. 4,011,455, Cl. 250-486.000.

Walsh, Thomas William, to Chomerics, Inc. Electrically conductive silicone rubber stock. 4,011,360, Cl. 428-402.000.

Wambach, Allen D., to General Electric Company. Reinforced thermoplastic polyester compositions. 4,011,193, Cl. 260-40.00R.

Wang, Chun Juan: *See*—
La Londe, Robert Thomas; Tsai, Amy Inn-Mei; Wang, Chun Juan; and Wong, Chunfook, 4,011,327.

Wang, Long Shyong; and Ruckel, Erwin Richard, to Arizona Chemical Company. Polymerization of olefins. 4,011,385, Cl. 526-190.000.

Wang, Shyh; and Tsang, Won-Tien, to United States of America, Air Force. Junction arrays for superconducting and nonsuperconducting application. 4,011,574, Cl. 357-6.000.

Ward, Gary Lee. Repair support assembly for automotive transmissions. 4,010,942, Cl. 269-15.000.

Warnock, Frederick E.: *See*—
Sochard, Irving I.; Petree, Marcella C.; Knutsen, Wallace N.; Warnock, Frederick E.; and White, Edward A., Jr., 4,010,689.

Warren, Herbert L.; and Wittrup, Bruce A., to United States Gypsum Company. Paper-backed acoustical tile. 4,010,817, Cl. 181-33.00G.

Warren, Walter D., to Texas Instruments Incorporated. Automatic dial system for a subscriber telephone. 4,011,414, Cl. 179-90.00B.

Wasserman, Rene: *See*—
Steine, Hans T.; Wasserman, Rene; and Simm, Wolfgang, 4,011,056.

Wasson, Burton Kendall, to Merck Sharp & Dohme (I.A.) Corporation. 4-(3-Amino-2-acyloxypropoxy)-1,2,5-thiadiazole compounds. 4,011,217, Cl. 260-247.10H.

Watanabe, Masaaki; Hasegawa, Masao; Yamada, Jiroe; and Kobayashi, Kouichi, to Asahi-Dow Limited. 1,1-Diphenyl ethane process. 4,011,274, Cl. 260-668.00C.

Watanabe, Misao; Fujii, Yasuji; and Takayanagi, Kiyoshi, to Furukawa Electric Co., Ltd., The. Materials for tamping battery mix. 4,011,075, Cl. 75-171.000.

Watanabe, Tadashi: *See*—
Iwasawa, Naozumi; Sugiyama, Nobuo; Yoshihara, Ichiro; Watanabe, Tadashi; and Kondo, Taizo, 4,011,381.

Waters Associates, Incorporated: *See*—
Nelson, Kenneth E., 4,011,451.

Watson, Jack H., to United States of America, Navy. Vibration responsive switch. 4,011,418, Cl. 200-61.45R.

Webb, Harley E., to South-Co Machinery Company, Inc. Program controlled power transmission. 4,010,700, Cl. 112-79.00R.

Weidenhammer, James A.: *See*—
Orlando, Anthony W.; and Weidenhammer, James A., 4,011,591.

Weinstein, Marvin J.; Daniels, Peter J. L.; Wagman, Gerald H.; and Testa, Raymond, to Schering-Plough Corporation. Semi-synthetic aminocyclitol aminoglycoside antibiotics and methods for the preparation thereof. 4,011,390, Cl. 536-17.000.

Welten, Ottar Torolf. Nursing bottle. 4,010,861, Cl. 215-11.00B.

Welty, Lloyd G. Self-draining vehicular supporting panel and structure. 4,011,022, Cl. 404-40.000.

Wendt, Hans: *See*—
Rahtz, Dieter; Wendt, Hans; and Koch, Henning, 4,011,322.

Wermuth, Camille Georges: *See*—
Schwartz, Jean; and Wermuth, Camille Georges, 4,011,342.

Werther, Heinz-Ulrich: *See*—
Hartmann, Heinrich; Hoffmann, Gerhard; Barzynski, Helmut; Lehner, August; Lenz, Werner; Stutz, Herbert; and Werther, Heinz-Ulrich, 4,011,084.

West, Charles T.; and Culbertson, George S., to Standard Oil Company (Indiana). Oxidation of polymers in presence of benzene sulfonic acid or salt thereof. 4,011,380, Cl. 526-30.000.

Western Electric Company: *See*—
Bachman, Albert K., 4,011,144.

Western Geophysical Company of America: *See*—
Pontius, Frank, 4,011,416.

Westinghouse Electric Corporation: *See*—
Uram, Robert, 4,010,605.

Westley, Melvin W., to Du Pont de Nemours, E. I., and Company. Flexible noise barrier material. 4,010,818, Cl. 181-33.00G.

Westmoreland, Twain. Display form for baby bootie. 4,010,878, Cl. 223-75.000.

Westvaco Corporation: *See*—
Gilbert, Earl F., 4,010,888.

Wetterlin, Kjell Ingvar Leopold; and Svensson, Leif Ake, to Aktiebolaget Draco. Orally active bronchospasmolytic compounds. 4,011,258, Cl. 260-479.00R.

Wharton, Richard F., to Marquis Industries, Inc. Electrical receptacle. 4,011,000, Cl. 339-130.00C.

Wheeler, Lawrence. Door lifting and holding tool. 4,010,931, Cl. 254-131.000.

White, Cygnal G. Self-contained engine warmer. 4,010,725, Cl. 123-142.50R.

White, Derek Graham Walter: *See*—
Curry, Harold George; Attwood, Brian William; White, Derek Graham Walter; Christensen, John Mosgaard; and Kroyer, Karl Kristian Kobs, 4,011,034.

White, Dwain M., to General Electric Company. Aromatized polyacetylenes. 4,011,378, Cl. 526-19.000.

White, Edward A., Jr.: *See*—
Sochard, Irving I.; Petree, Marcella C.; Knutsen, Wallace N.; Warnock, Frederick E.; and White, Edward A., Jr., 4,010,689.

Whitehead, David Lasilla: *See*—
Demchak, Richard Joseph; and Whitehead, David Lasilla, 4,011,062.

Whitewater Electronics, Inc.: *See*—
Quirke, Patric C., 4,011,552.

Wiechert, Rudolf: *See*—
Petzoldt, Karl; Vidic, Hans-Jorg; Prezewowsky, Klaus; Nishino, Yukishige; Wiechert, Rudolf; and Laurent, Henry, 4,011,314.

Wicking, Hans Wilhelm; and Ehlers, Karl, to Preussag Aktiengesellschaft Metall. Method and apparatus of refining crude cadmium. 4,010,937, Cl. 266-149.000.

Wileman, Richard D.: *See*—
Allyn, Jerome B.; Wileman, Richard D.; and Kozak, John, 4,010,939.

Wilgus, James L. Collapsible insulated box. 4,010,865, Cl. 220-6.000.

Wilkins, George A.: *See*—
Hightower, John D.; Beaman, George R.; Wilkins, George A.; and Murphy, Douglas W., 4,010,619.

Willemsen, Willem Hendrik. Plate provided with apertures separated from each other by separating ribs for an installation for the manufacture of sticks from dough material. 4,011,038, Cl. 425-302.00R.

Williams, David M. Irrigation method and apparatus. 4,010,898, Cl. 239-11.000.

Williams, Ernest E., to Rockwell International Corporation. Apparatus for coating substrates. 4,010,710, Cl. 118-49.000.

Williams, John Weaver: *See*—
Connell, John Bradford; and Williams, John Weaver, 4,010,705.

Williams, Norman P.; Horton, Roald N.; and Ruff, Frank A., to United States of America, Air Force. Fast acting waveguide coupler. 4,011,532, Cl. 333-98.00R.

Wilson, Esther, to Lawrence Peska Associates, Inc., a part interest. Toothpaste dispenser and container. 4,010,870, Cl. 222-78.000.

Wilson, Jack: *See*—
Kantrowitz, Arthur R.; Gerry, Edward T.; Leonard, Donald A.; and Wilson, Jack, 4,011,521.

Wiremold Company, The: *See*—
Rejeski, William E.; and D'Aprile, Paul, 4,010,518.

Wirth Gallo and Company: *See*—
Gallo, Mario, 4,010,638.

Wirth, Hermann, to Robert Bosch G.m.b.H. Electrostatic powder spray coating apparatus. 4,010,713, Cl. 118-621.000.

Witkin, Donald Eli; and Crum, Andrew Stephenson Dalgleish, to National Forge Company. Multizone electrical furnace methods and apparatus. 4,011,430, Cl. 219-486.000.

Wittrup, Bruce A.: *See*—
Warren, Herbert L.; and Wittrup, Bruce A., 4,010,817.

Wolf, Alfred P.: *See*—
Lambrecht, Richard M.; Packer, Samuel; Merrill, Jerald C.; Atkins, Harold L.; Wolf, Alfred P.; and Bradley-Moore, Patrick R., 4,011,307.

Wolf, William Edward, to Du Pont de Nemours, E. I., and Company. Web defect monitor for abrupt changes in web density. 4,011,457, Cl. 250-563.000.

Wolfson, Stanley W.: *See*—
Markovits, Arthur L.; and Wolfson, Stanley W., 4,011,350.

Wolicki, Richard J., to Buffalo Brake Beam Company. Rod splice. 4,010,629, Cl. 72-368.000.

Wommack, Joel Benjamin, Jr., to Du Pont de Nemours, E. I., and Company. Alkyl 4-[o-(substituted methyleneamino)phenyl]-3-thioallophanates. 4,011,213, Cl. 260-240.00G.

Wong, Chunfook: *See*—
La Londe, Robert Thomas; Tsai, Amy Inn-Mei; Wang, Chun Juan; and Wong, Chunfook, 4,011,327.

Woo, Gar Lok; Dale, John M.; and Ludwig, Allen C., to Chevron Research Company. Continuous sulfur foam preparation using polyisocyanates. 4,011,179, Cl. 260-2.50A.

Wood, Prentice J.; and Stout, James T., to Mead Corporation, The. Article carrier. 4,010,847, Cl. 206-187.000.

Wooddell, John H.: *See*—
Oldham, Robert R.; Wooddell, John H.; and Cain, Arthur L., 4,011,162.

Wooten, Willis C., Jr.: *See*—
Seymour, Robert W.; and Wooten, Willis C., Jr., 4,011,285.

Worden, Robert A., to Minnesota Mining and Manufacturing Company. Leather-like waterlaid sheets containing particulate fillers. 4,011,130, Cl. 162-151.000.

Worthing, Albert L., to Shur-Lok Corporation. Fastener structures utilizing a thermoplastic adhesive. 4,010,519, Cl. 24-141.000.

Wossagk, Ulf: *See*—
Kolbinger, Hans; and Wossagk, Ulf, 4,010,672.

Wright, Herschel Eugene, to Beckman Instruments, Inc. Centrifuge rotor lid. 4,010,890, Cl. 233-1.00R.

Wright, John B.: *See*—
Hall, Charles M.; Hsi, Richard S. P.; and Wright, John B., 4,011,337.

Wroblewski, Jerzy, to UNITECH Przedsiebiorstwo Techniczno-Hand-Lowe. Memory circuit for tuning of an electronically tuned receiver to a preselected station. 4,011,514, Cl. 325-464.000.

Wuthrich, Paul, to Timex Corporation. High frequency reed time governor for a timepiece. 4,010,602, Cl. 58-23.0AC.

Xerox Corporation: *See*—
Honjo, Satoru; and Sato, Masamichi, 4,011,078.
Lama, William L.; Seachman, Ned J.; and Bright, Clark I., 4,011,009.
Pearson, James M.; and Yanus, John F., 4,011,266.
Schank, Richard L.; and Crystal, Richard G., 4,010,687.
Swanberg, Melvin E., 4,011,446.

Xomox Corporation: *See*—
Smith, Russell G., 4,010,928.

Y-Tex Corporation: *See*—
Schwindt, Jackson T., 4,010,563.

Yamada, Jiroe: *See*—
Watanabe, Masaaki; Hasegawa, Masao; Yamada, Jiroe; and Kobayashi, Kouichi, 4,011,274.

Yamada, Sachiko: *See—*
Ishikawa, Masayuki; Kaneko, Chikara; Sasaki, Satoshi; Suda, Tatsuo; Yamada, Sachiko; and Sugimoto, Akiko, 4,011,250.

Yamaguchi, Masayasu: *See—*
Konomi, Tuyoshi; Yukimatsu, Keiji; Katsuo, Kenichi; and Yamaguchi, Masayasu, 4,011,203.

Yamaguchi, Shiyousaku: *See—*
Hishiki, Hideo; Yamaguchi, Shiyousaku; and Miyazaki, Akihisa, 4,010,535.

Yamaha, Hatsudoki Kabushiki Kaisha: *See—*
Naito, Masaharu; and Nomura, Kazuhiko, 4,010,829.

Yamamoto, Hiroichi: *See—*
Horii, Satoshi; Kameda, Yukihiko; Iwasa, Takashi; and Yamamoto, Hiroichi, 4,011,391.

Yamamoto, Nobuo: *See—*
Sakai, Takeo; Yoneyama, Masakazu; and Yamamoto, Nobuo, 4,011,082.

Yamamura, Nobuyuki: *See—*
Tanimura, Shigeru; Yamamura, Nobuyuki; and Koide, Masanobu, 4,011,577.

Yamaoka, Masayoshi: *See—*
Terao, Shinji; Shiraishi, Mitsuru; Miyawaki, Toshio; Minamida, Isao; Yamaoka, Masayoshi; and Numata, Mitsuo, 4,011,214.

Yamaura, Kazuhiko: *See—*
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Yamazaki, Hisao: *See—*
Ito, Takuji; and Yamazaki, Hisao, 4,011,151.

Yamazaki, Yoshio: *See—*
Kamatani, Yoshio; Okazaki, Hisayoshi; Imai, Ko; Fujita, Noriaki; Yamazaki, Yoshio; and Ogino, Katsuhiko, 4,011,135.

Yanus, John F.: *See—*
Pearson, James M.; and Yanus, John F., 4,011,266.

Yasuda, Fujio; Saito, Teruo; and Hiroyasu, Mamoru, to Matsushita Electric Industrial Co., Ltd. Rotary head type magnetic tape video recording-reproducing device. 4,011,588, Cl. 360-71.000.

Yates, Colin K.: *See—*
Cole, Henry B.; and Yates, Colin K., 4,011,069.

Yokogawa Electric Works, Ltd.: *See—*
Tochitani, Yutaka; Shinbata, Takashi; and Morioka, Yoshitsugu, 4,011,556.

Yoneda, Minoru: *See—*
Fukase, Hisahiko; and Yoneda, Minoru, 4,011,493.

Yonemitsu, Eiichi; Sugio, Akitoshi; and Kawaki, Takao, to Mitsubishi Gas Chemical Co., Ltd. Novel polyphenylene ether and process for preparing the same. 4,011,200, Cl. 260-47.0ET.

Yoneyama, Masakazu: *See—*
Sakai, Takeo; Yoneyama, Masakazu; and Yamamoto, Nobuo, 4,011,082.

Yoshida, Akio: *See—*
Nishii, Yasuho; Hata, Shun-ichi; Wakabayashi, Kiyoshige; Mizuno, Koji; Yoshida, Akio; and Shindo, Minoru, 4,011,219.

Yoshida, Hiroshi, to Yoshida Kogyo Kabushiki Kaisha. Coupling element for slide fastener. 4,010,520, Cl. 24-205.13R.

Yoshida Kogyo Kabushiki Kaisha: *See—*
Yoshida, Hiroshi, 4,010,520.

Yoshihara, Ichiro: *See—*
Iwasawa, Naozumi; Sugiyama, Nobuo; Yoshihara, Ichiro; Watanabe, Tadashi; and Kondo, Taizo, 4,011,381.

Yoshino, Sadafumi: *See—*
Kobayashi, Tatsumi; Takakura, Yutaka; Yoshino, Sadafumi; and Fukuda, Yoshiaki, 4,011,254.

Yoshinuma, Yakichi: *See—*
Kageyama, Tomo; and Yoshinuma, Yakichi, 4,011,417.

Young, Donald C., to Union Oil Company of California. Ammonium phosphate production and the reduction of fluorine and silicon emissions. 4,011,301, Cl. 423-313.000.

Young, Donald C.: *See—*
Harbolt, Bruce A.; and Young, Donald C., 4,011,300.

Young, Donald Warren, to Koppers Company, Inc. Blank feeding device having an adjustable and automatic positioning backstop means. 4,010,944, Cl. 271-99.000.

Young, Leo: *See—*
Podell, Allen F.; Young, Leo; Karp, Arthur; and Chambers, Donald R., 4,011,528.

Young, Robert J. Table game. 4,010,952, Cl. 273-30.000.

Young, Stuart Jay; and Berger, Isaac. Oscillating toothbrush. 4,010,506, Cl. 15-22.00R.

Youngblood, Thomas Franklin, to Dresser Industries, Inc. Expandable raise bit. 4,010,808, Cl. 175-334.000.

Yue, Sing Tsze. Stannous sulfate and gypsum mixture as a retarder in grinding portland cement and blended hydraulic cement for improving the quality of the cement, mortar and concrete. 4,011,092, Cl. 106-89.000.

Yukimatsu, Keiji: *See—*
Konomi, Tuyoshi; Yukimatsu, Keiji; Katsuo, Kenichi; and Yamaguchi, Masayasu, 4,011,203.

Zachery, James E. Compression-expansion power device. 4,010,611, Cl. 60-516.000.

Zahner, John C., to Mobil Oil Corporation. Conversion of modified synthesis gas to oxygenated organic chemicals. 4,011,275, Cl. 260-668.00R.

Zahnradfabrik Friedrichshafen AG: *See—*
Brendel, Uwe; and Bucksch, Manfred, 4,010,833.

Zaitsev, Aron Iosifovich: *See—*
Kaminsky, Igor Vasilievich; Protasov, Viktor Dmitrievich; Pimenov, Viktor Alexeevich; Barynin, Vyacheslav Alexandrovich; Shestakov, Vladimir Vladimirovich; Polyakov, Vladimir Larionovich; Severov, Genrikh Fedorovich; Zaitsev, Aron Iosifovich; and Stepanov, Stanislav Vasilievich, 4,010,906.

Zang, Thomas: *See—*
Hense, Karl-Hermann; and Zang, Thomas, 4,010,523.

Zeffren, Eugene: *See—*
Diehl, Francis Louvaine; Zeffren, Eugene; and Milbrada, Edward John, 4,011,169.

Zeidler, Dennis E.: *See—*
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Zellerman, Gabor: *See—*
Vilaghy, Miklos I.; and Zellerman, Gabor, 4,010,737.

Zellner, Wilhelm: *See—*
Mayr, Gunter; Leonhardt, Fritz; Andra, Wolfhart; Baur, Willi; Zellner, Wilhelm; and Schlaich, Jorg, 4,010,580.

Zemler, Willibald: *See—*
Frantl, Erich; Hofstatter, Peter; and Zemler, Willibald, 4,011,020.

Zenith Radio Corporation: *See—*
Baur, Leslie L.; and Hajduk, Thaddeus J., 4,010,525.

Zepp, Robert Glenn, to I-T-E Imperial Corporation. Common reset extension for plurality of overload relays. 4,011,423, Cl. 200-330.000.

Zinner, Karl. Cutting-off tool. 4,011,050, Cl. 29-96.000.

Ziselman, Boris Grigorievich: *See—*
Pimshtein, Pavel Gdalievich; Shel, Marat Moiseevich; Khismatulin, Enver Rakhmatullovich; Borsuk, Evgeny Grigorievich; Novikov, Alexandr Nikolaevich; Makarov, Viktor Matveevich; Ziselman, Boris Grigorievich; Kuramzhin, Alexandr Valeryanovich; Usenko, Viktor Grigorievich; Globin, Nikolai Kirillovich; and Ivantsov, Vladimir Viktorovich, 4,010,864.

Zubritsky, Elizabeth A.: *See—*
Tomalia, Donald A.; and Zubritsky, Elizabeth A., 4,011,376.

Zuern, Ludwig: *See—*
Popp, Karl Hugo; Hess, Klaus; Simmler, Werner; Stickel, Richard; and Zuern, Ludwig, 4,011,161.

Zundorf, Dieter: *See—*
Munzner, Heinrich; Heimbach, Heinrich; Korbacher, Werner; Peters, Werner; Juntgen, Harald; Knoblauch, Karl; and Zundorf, Dieter, 4,011,065.

Zunker, David William: *See—*
Murphy, Charles Vincent; and Zunker, David William, 4,011,388.

Zurflueh, Rene: *See—*
Hangartner, Walter; and Zurflueh, Rene, 4,011,335.

Zyla, Gregory J.; and Platt, Michael T., to Zyla, said Gregory J., by said Michael T. Platt. Drag racing game apparatus. 4,010,956, Cl. 273-134.0CA.

Zyla, said Gregory J.: *See—*
Zyla, Gregory J.; and Platt, Michael T. (said Michael T. Platt assors. to), 4,010,956.

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977	B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976	B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976	B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977	B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977	B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976	B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976	B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976	B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 105,006	4,007,074	Mar. 23, 1976	Feb. 8, 1977	B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977	B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976	B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976	B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976	B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976	B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977	B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977	B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976	B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976	B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976	B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 223,678	3,989,159	Mar. 9, 1976	Nov. 2, 1976	B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976	B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977	B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976	B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976	B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976	B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976	B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977	B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976	B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977	B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976	B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 281,162	4,009,481	Mar. 23, 1976	Feb. 22, 1977	B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976	B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977	B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976	B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976	B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976	B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976	B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976	B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976	B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977	B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976	B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977	B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977	B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976	B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977	B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976	B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977	B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977	B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976	B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977	B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976	B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977	B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976	B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976	B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976	B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976	B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977	B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976	B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976	B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977	B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976	B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976	B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976	B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977	B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976	B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976	B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976	B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976	B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976	B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977	B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977	B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976	B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976	B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977	B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976	B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976	B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977	B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976	B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976	B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977
B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977	B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976	B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977	B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976	B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976	B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977	B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976	B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976	B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,067	4,005 394	Mar. 23, 1976	Jan. 25, 1977
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976	B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976	B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976	B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976	B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977	B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977	B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977	B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976	B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977	B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976	B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976	B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976	B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976	B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976	B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976	B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976	B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976	B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976	B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976	B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976	B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976	B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976	B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976	B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976	B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976	B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977	B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977	B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976	B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976	B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976	B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976	B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976	B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976	B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976	B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977	B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976	B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976	B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976	B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976	B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976	B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977	B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977	B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976	B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976	B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976	B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976	B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976	B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976	B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976	B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976	B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976	B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976	B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976	B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976	B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976	B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976	B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976	B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976	B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976	B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976	B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976	B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976	B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976	B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976	B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976	B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977	B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976	B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976	B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976	B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976	B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977	B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977	B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976	B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976	B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976	B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976	B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976	B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976	B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976	B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976	B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976	B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977	B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976	B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976	B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976	B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976	B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976	B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976	B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976	B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976	B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977	B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976	B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977	B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976	B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976	B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976	B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976	B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976	B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976	B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976	B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976	B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976	B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976	B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976	B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976	B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976	B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976	B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976	B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976	B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977	B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976	B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976	B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976	B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976	B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976	B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977	B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976	B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976	B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976	B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976	B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976	B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976	B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976	B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976	B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976	B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976	B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976	B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976	B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977	B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977	B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976	B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976	B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977	B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977	B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976	B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976	B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976	B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976	B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976	B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976	B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976	B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976	B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976	B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976	B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977	B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976	B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976	B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976	B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976	B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976	B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976	B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976	B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976	B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976	B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976	B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976	B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976	B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976	B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976	B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976	B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976	B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976	B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976	B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976	B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977	B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976	B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976	B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976	B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976	B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976	B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976	B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976	B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976	B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977	B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977
B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 8TH DAY OF MARCH, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Arai, Atsuaki: *See*—
Yoshida, Yoshinobu; and Arai, Atsuaki, Re. 29,148.

Fiala, Ernst, to Repa Feinstanzwerk GmbH. Energy absorber for automobile safety belts. Re. 29,147, Cl. 242-107.40A.

Fuji Photo Film Co., Ltd.: *See*—
Yoshida, Yoshinobu; and Arai, Atsuaki, Re. 29,148.

General Instrument Corporation: *See*—
Harten, John T.; and Zoladz, Frank J., Re. 29,150.

Harten, John T ; and Zoladz, Frank J., to General Instrument Corporation. Convergence coil assembly for color television. Re. 29,150, Cl. 335-212.000.

Qonaar Corporation: *See*—
Wimpffen, George I., Re. 29,146.

Repa Feinstanzwerk GmbH: *See*—
Fiala, Ernst, Re. 29,147.

Union Oil Company of California: *See*—
Young, Donald C., Re. 29,149.

Wimpffen, George I., to Qonaar Corporation. Housing for coin operated constructions. Re. 29,146, Cl. 70-170.000.

Yoshida, Yoshinobu; and Arai, Atsuaki, to Fuji Photo Film Co., Ltd. Color photographic diffusion transfer process. Re. 29,148, Cl. 96-3.000.

Young, Donald C., to Union Oil Company of California. Production of ammonium phosphates and product thereof. Re. 29,149, Cl. 423-313.000.

Zoladz, Frank J.: *See*—
Harten, John T.; and Zoladz, Frank J., Re. 29,150.

LIST OF PLANT PATENTEES

Dalton, William E. Apple tree. 4,021, 3-8-77, Cl. 34.000.

Driscoll Strawberry Associates, Inc.: *See*—
Johnson, Harold A., Jr., 4,022.

Johnson, Harold A., Jr., to Driscoll Strawberry Associates, Inc. Strawberry plant. 4,022, 3-8-77, Cl. 49.000.

LIST OF DESIGN PATENTEES

Alvarez, Teresita E., to Burlington Industries, Inc. Pantyhose. 243,561, 3-8-77, Cl. D2-6.000.

Amoroso, Nicholas A., to Bright Star Industries, Inc. Bicycle reflector. 243,590, 3-8-77, Cl. D10-111.000.

Anchor Hocking Corporation: *See*—
Benes, Frank J., 243,579.

Angleman, John D.; and DuCret, Doris, to Bristol-Myers Company. Combined bottle and closure. 243,585, 3-8-77, Cl. D9-147.000.

Araki, Toshihiro, to Japan Suncrux Co., Ltd. Clock. 243,586, 3-8-77, Cl. D10-15.000.

Armstrong Cork Company: *See*—
Schouten, Gerard M., 243,577.

Atari, Inc.: *See*—
Cheng, Regan L., 243,626.
Sauter, Kenneth W., 243,625.
Takaichi, Peter L., 243,624.

Axelsson, Per Axel Torbjorn. Tooth brush. 243,568, 3-8-77, Cl. D4-25.000.

Bartlett, Robert N., to Windsor Industries, Inc. Hot water extraction-type carpet cleaning apparatus and wheeled dolly therefor. 243,574, 3-8-77, Cl. D15-54.000.

Bausch & Lomb Incorporated: *See*—
Leeming, Arthur B., Sr.; and Speaker, Edwin A., 243,601.

Belz, Frederick W. Automobile body. 243,595, 3-8-77, Cl. D12-92.000.

Benes, Frank J., to Anchor Hocking Corporation. Pitcher or similar article. 243,579, 3-8-77, Cl. D7-64.000.

Biondo, Joseph G., to Engelhard Minerals & Chemicals Corporation. Disposable capsule for separately storing components of dental amalgams. 243,628, 3-8-77, Cl. D24-99.000.

Bright Star Industries, Inc.: *See*—
Amoroso, Nicholas A., 243,590.

Bristol-Myers Company: *See*—
Angleman, John D.; and DuCret, Doris, 243,585.

Brych, Alfred, to Saft-Societe des Accumulateurs Fixes et de Traction. Lamp. 243,629, 3-8-77, Cl. D48-24.00A.

Burke, Ronald L.; and Sulik, Jay R., to Zoecon Industries, Inc. Ear tag. 243,622, 3-8-77, Cl. D30-43.000.

Burlington Industries, Inc.: *See*—
Alvarez, Teresita E., 243,561.

Capitol Products Corporation: *See*—
Goss, Lorane C., Jr.; Cribben, James T.; and Miller, Joseph J., 243,581.

Carlson, John A., to Conchemco, Incorporated. Bow string cable fitting. 243,606, 3-8-77, Cl. D22-99.000.

Casparro, John J. Rotary advertising display. 243,640, 3-8-77, Cl. D96-12.00R.

Cheng, Regan L., to Atari, Inc. Game cabinet. 243,626, 3-8-77, Cl. D34-5.00J.

Clower, Robert E. Child's coaster vehicle. 243,627, 3-8-77, Cl. D34-15.0AJ.

Conchemco, Incorporated: *See*—
Carlson, John A., 243,606.

Cone, Richard E.: *See*—
Lieding, Robert K.; and Cone, Richard E., 243,569.

Craig, Randall T. Water sweeper. 243,610, 3-8-77, Cl. D23-35.000.

Cribben, James T.: *See*—
Goss, Lorane C., Jr.; Cribben, James T.; and Miller, Joseph J., 243,581.

Danat, Alfred W. Drinking mug. 243,578, 3-8-77, Cl. D7-5.000.

Dart Industries Inc.: *See*—
Flaherty, Charles Martin, 243,573.
Rabinowitz, Harold, 243,637.

Davidson, Charles Patrick Duncan, to Joseph Lucas Limited. Bicycle frame. 243,598, 3-8-77, Cl. D12-111.000.

DeCaro, Charles J., to Textron, Inc. Fastener. 243,580, 3-8-77, Cl. D8-388.000.

de Massacre, Guy. Boot. 243,566, 3-8-77, Cl. D2-272.000.

de Massacre, Guy. Boot. 243,567, 3-8-77, Cl. D2-272.000.

de Massacre, Guy Charles. Ornamental design for a boot. 243,565, 3-8-77, Cl. D2-272.000.

DuCret, Doris: *See*—
Angleman, John D.; and DuCret, Doris, 243,585.

Eldon Industries, Inc.: *See*—
Evenson, Mel, 243,604.

Engelhard Minerals & Chemicals Corporation: *See*—
Biondo, Joseph G., 243,628.

Escalante, Conrad J. Bezel flashing sign. 243,639, 3-8-77, Cl. D96-12.00R.

Evenson, Mel, to Eldon Industries, Inc. List finder. 243,604, 3-8-77, Cl. D19-76.000.

Excelco International Inc.: *See*—
Ho, Shelton Shiu-Tong, 243,587.
Ho, Shelton Shiu-Tong, 243,588.

Ficks Reed Company: *See*—
Wisner, John B., 243,571.

Flaherty, Charles Martin, to Dart Industries Inc. Measuring cup rack. 243,573, 3-8-77, Cl. D6-114.000.

Fratelli Saporiti: *See*—
Offredi, Giovanni, 243,572.

Gilbert, Donald E. Light attracting insect electrocutor. 243,611, 3-8-77, Cl. D22-19.000.

Gilbert, Donald E. Electric control unit for flying insects. 243,612, 3-8-77, Cl. D22-19.000.
Gillette Company, The: *See—*
Poisson, Norman D., 243,638.
Gilmartin, Harry M. Vehicle tire traction device. 243,599, 3-8-77, Cl. D12-154.000.
Goss, Lorane C., Jr.; Cribben, James T.; and Miller, Joseph J., to Capitol Products Corporation. Guide spring for window sashes or similar article. 243,581, 3-8-77, Cl. D8-395.000.
Headington, Marion Leon, Jr. Motorcycle camper housing. 243,597, 3-8-77, Cl. D12-103.000.
Hilfiker Pipe Co.: *See—*
Hilfiker, William K., 243,613.
Hilfiker, William K., to Hilfiker Pipe Co. Retaining wall stringer. 243,613, 3-8-77, Cl. D25-77.000.
Ho, Shelton Shiu-Tong, to Excelco International Inc. Pendant watch. 243,587, 3-8-77, Cl. D10-30.000.
Ho, Shelton Shiu-Tong, to Excelco International Inc. Wrist watch. 243,588, 3-8-77, Cl. D10-33.000.
Igo, Toshio: *See—*
Murakami, Tsutomu; Igo, Toshio; Kawamura, Ken; Makino, Katsuhiko; Koda, Hironosuke; and Murakami, Shinzo, 243,630.
International Standard Electric Corporation: *See—*
Knox, John E., 243,575.
Japan Suncrux Co., Ltd.: *See—*
Araki, Toshihiro, 243,586.
Joseph Lucas Limited: *See—*
Davidson, Charles Patrick Duncan, 243,598.
Kawamura, Ken: *See—*
Murakami, Tsutomu; Igo, Toshio; Kawamura, Ken; Makino, Katsuhiko; Koda, Hironosuke; and Murakami, Shinzo, 243,630.
Kaye, Gordon E., to P. R. Mallory & Co., Inc. Electric battery. 243,615, 3-8-77, Cl. D13-8.000.
Kaye, Gordon E., to P. R. Mallory & Co., Inc. Electric battery. 243,616, 3-8-77, Cl. D13-8.000.
Kaye, Gordon E., to P. R. Mallory & Co., Inc. Electric battery. 243,617, 3-8-77, Cl. D13-8.000.
Kaye, Gordon E., to P. R. Mallory & Co., Inc. Electric battery. 243,618, 3-8-77, Cl. D13-8.000.
Knox, John E., to International Standard Electric Corporation. Stand for a teleprinter. 243,575, 3-8-77, Cl. D6-181.000.
Koch, Jeffrey F. Self-propelled hang glider carriage. 243,594, 3-8-77, Cl. D12-81.000.
Koda, Hironosuke: *See—*
Murakami, Tsutomu; Igo, Toshio; Kawamura, Ken; Makino, Katsuhiko; Koda, Hironosuke; and Murakami, Shinzo, 243,630.
Kreisel, Betty C. Head covering. 243,563, 3-8-77, Cl. D2-243.000.
Kreisel, Betty C. Head covering. 243,564, 3-8-77, Cl. D2-243.000.
Kruse, William H. Woman's two-piece bathing suit. 243,562, 3-8-77, Cl. D2-37.000.
Ksenych, Nick. Livestock trailer. 243,596, 3-8-77, Cl. D12-102.000.
Laurenzi, Richard F. Chair. 243,570, 3-8-77, Cl. D6-7.000.
Leeming, Arthur B., Sr.; and Speaker, Edwin A., to Bausch & Lomb Incorporated. Microscope. 243,601, 3-8-77, Cl. D16-57.000.
Lieding, Robert K.; and Cone, Richard E. Baby carrier. 243,569, 3-8-77, Cl. D6-7.000.
Lipford, John T.: *See—*
Smith, Harvey J., Sr.; and Lipford, John T., 243,593.
Lowrance Electronics, Inc.: *See—*
Moore, John C., 243,589.
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Murakami, Tsutomu; Igo, Toshio; Kawamura, Ken; Makino, Katsuhiko; Koda, Hironosuke; and Murakami, Shinzo, 243,630.
Martin, Gilbert I.: *See—*
Rubin, Stuart C.; and Martin, Gilbert I., 243,636.
Matsushita Electric Industrial Co., Ltd.: *See—*
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Mono, Rune G.; and Morichetto, Michele. Spout. 243,607, 3-8-77, Cl. D23-32.000.
Mono, Rune G.; and Morichetto, Michele. Faucet. 243,608, 3-8-77, Cl. D23-23.000.
Mono, Rune G.; and Morichetto, Michele. Handshower. 243,609, 3-8-77, Cl. D23-35.000.
Moore, John C., to Lowrance Electronics, Inc. Sonar unit for fishermen. 243,589, 3-8-77, Cl. D10-46.000.
Morichetto, Michele: *See—*
Mono, Rune G.; and Morichetto, Michele, 243,607.
Mono, Rune G.; and Morichetto, Michele, 243,608.
Mono, Rune G.; and Morichetto, Michele, 243,609.
Morrison, David J. Soap bar. 243,631, 3-8-77, Cl. D73-1.00A.
Morrison, David J. Soap bar. 243,632, 3-8-77, Cl. D73-1.00A.
Morrison, David J. Soap bar. 243,633, 3-8-77, Cl. D73-1.00A.
Morrison, David J. Soap bar. 243,634, 3-8-77, Cl. D73-1.00A.
Murakami, Shinzo: *See—*
Murakami, Tsutomu; Igo, Toshio; Kawamura, Ken; Makino, Katsuhiko; Koda, Hironosuke; and Murakami, Shinzo, 243,630.
Murakami, Tsutomu; Igo, Toshio; Kawamura, Ken; Makino, Katsuhiko; Koda, Hironosuke; and Murakami, Shinzo, to Matsushita Electric Industrial Co., Ltd. Radio receiver. 243,630, 3-8-77, Cl. D14-75.000.
Offredi, Giovanni, to Fratelli Saporiti. Chair. 243,572, 3-8-77, Cl. D6-75.000.
Olsson, Karl Axel Torbjorn, to Telefonaktiebolaget. Telephone instrument. 243,619, 3-8-77, Cl. D14-53.000.
Owens-Illinois, Inc.: *See—*
Reynolds, Raymond G., 243,583.
Reynolds, Raymond G., 243,584.
P. R. Mallory & Co., Inc.: *See—*
Kaye, Gordon E., 243,615.
Kaye, Gordon E., 243,616.
Kaye, Gordon E., 243,617.
Kaye, Gordon E., 243,618.
Poisson, Norman D., to Gillette Company, The. Safety razor blade assembly. 243,638, 3-8-77, Cl. D28-47.000.
Priest, Lee-Louise H., to Zoecon Industries, Inc. Ear tag. 243,623, 3-8-77, Cl. D30-43.000.
Rabinowitz, Harold, to Dart Industries Inc. Vacuum bottle tote bag. 243,637, 3-8-77, Cl. D87-1.00R.
Reynolds, Raymond G., to Owens-Illinois, Inc. Plastic sleeve-encased bottle. 243,583, 3-8-77, Cl. D9-12.000.
Reynolds, Raymond G., to Owens-Illinois, Inc. Bottle. 243,584, 3-8-77, Cl. D9-119.000.
Robert Bosch G.m.b.H.: *See—*
Slany, Hans Erich, 243,600.
Rubin, Stuart C.; and Martin, Gilbert I. Medicament dispenser for children. 243,636, 3-8-77, Cl. D83-12.00A.
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Brych, Alfred, 243,629.
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Leeming, Arthur B., Sr.; and Speaker, Edwin A., 243,601.
Sulik, Jay R., to Zoecon Industries, Inc. Ear tag. 243,621, 3-8-77, Cl. D30-43.000.
Sulik, Jay R.: *See—*
Burke, Ronald L.; and Sulik, Jay R., 243,622.
Taber, Helen L. Christmas wall hanging. 243,592, 3-8-77, Cl. D11-121.000.
Taishoff, Howard Alan. Panel for display of time or frequency, or both. 243,591, 3-8-77, Cl. D10-125.000.
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Telefonaktiebolaget: *See—*
Olsson, Karl Axel Torbjorn, 243,619.
Textron, Inc.: *See—*
DeCaro, Charles J., 243,580.
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CLASSIFICATION OF PATENTS

ISSUED MARCH 8, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

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12.4 4,010,495
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1 4,010,497
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167 R 4,010,509
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214 E 4,010,749
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